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Vol. 13. No. 6. pp. 199-236. June, 1943

THE VETERINARY BULLETIN

1943

IMPERIAL INSTITUTE
10 1943

IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net Annual Subscription £2

Imperial Agricultural Bureaux.

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Zuckerman, S. See Krohn, P. L., et al., jt. authors, 220.

ERRATUM

Vol. 13. p. 176, for "ZAPL, P. A." *et al.*, read "ZAHL, P. A." *et al.*

REVIEW ARTICLES

(1) " **Antibacterial Agents derived from Micro-Organisms.**"

(2) " **The Present Position of Phenothiazine as an Anthelmintic.**"

Reprints (price 1/- and 1/6 respectively) obtainable from: Central Sales Branch (Imperial Agricultural Bureaux), Agricultural Research Building, Penglais, Aberystwyth.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

Bulletins on disease subjects written for farmers and " popular " articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

NOTE.—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 13.] June, 1943. [No. 6.

DISEASES CAUSED BY BACTERIA AND FUNGI

SPRUNT, D. H., & CAMALIER, W., Jr. (1942). **Reduction of Pulmonary Resistance to Infection by Circulating Toxins.**—*Arch. Path.* **34.** 801–806. **1324**

Intravenous injection of staphylococcus toxin into rabbits produced diffuse microscopic pulmonary lesions of considerable variety, but, in general, small doses led to an increase of mononuclear cells in the interstitial tissue, while larger doses caused oedema and haemorrhage. It is considered that the pulmonary damage may lower the local resistance of the lung, and predispose to secondary bacterial invasion and subsequent pneumonia. Similar lesions were found in human lungs, and were thought to have arisen as a result of toxic action from a remote focus of infection such as the uterus or middle ear.—E. COTCHIN.

GUNSALUS, I. C., & WOOD, A. J. (1942). **The Dehydrogenation of Alcohols by Streptococci of Group B.**—*J. Bact.* **44.** 523–528. **1325**

The oxidation of alcohols by strains of group B streptococci was studied by means of the reduction of methylene blue in Thunberg tubes. Methyl alcohol was not activated by any of these streptococci nor by a strain of *Bacterium coli* used as a control. Several alcohols, including the normal alcohols C_2 to C_5, secondary alcohols C_3 to C_5, tertiary amyl alcohol, and 2–3 butylene glycol very rapidly gave up their hydrogen to methylene blue, more rapidly than glucose. Glycerol was dehydrogenated by some strains but the results were somewhat complex. An adaptive mechanism was found to be present in some strains. The control culture of *Bact. coli* dehydrogenated alcohols at a very slow rate.—E. J. M. HAYWARD.

COHRS, P. (1941). Die Druse des Pferdes im Lichte der neueren Forschung. [**Equine Strangles in the Light of Recent Research**].—*Berl. Münch. tierärztl. Wschr.* Jan. 31st. 49–52. **1326**

This is a brief review of the literature on strangles from 1926–40 inclusive.—D. L. ROBARTS.

FONYÓ, J. (1941). Über die biochemischen Eigenschaften der aus Rohmilch gezüchteten hämolytischen Streptokokken. [**Biochemical Properties of Haemolytic Streptococci Cultivated from Raw Milk**].—*Biochem. Z.* **308.** 78–82. **1327**

From 50 milk specimens, there were obtained 31 strains of serological group A, 19 group B, 10 group C, and 6 group G streptococci. Transitional forms were not encountered. Most strains also gave the typical biochemical reactions of their type. Group A strains were all strongly haemolytic, and did not attack sodium hippurate. Trehalose and lactose, but not sorbitol and mannitol, were fermented by 22 strains, one of which developed on bile-containing media. All four sugars were attacked by eight strains, three of which grew upon bile-containing media. One strain attacked only lactose, and also grew upon the bile media. Group B strains all grew upon bile media, and produced a higher degree of acidity in 1% glucose than group A. Trehalose, lactose, and sodium hippurate were attacked by 16 strains, while three all with weak lytic activity, attacked only sorbitol and trehalose. All groups C and G strains attacked trehalose and lactose only. Group G strains all developed on bile media; one strain had weak lytic activity.—J. G. CARR.

KENNEDY, A. J. (1943). **Chronic Bovine Mastitis. An Attempt to Discover the Relationship between Clinical Symptoms and Infection with Streptococcus agalactiae.**—*Vet. Rec.* **55.** 45–46. **1328**

An attempt was made to confirm the view now widely held that injury to the udder precedes the establishment of *Str. agalactiae* in the udder and that such specific infection when found is probably secondary to an inflammatory process.

Observations were carried out on a herd of 35 Ayrshire cows, 65 quarters, originally negative to bacteriological tests for mastitis organisms, being examined twice daily for 143 days. Control bacteriological tests were carried out at weekly intervals during this period.

The clinical conditions recorded were sores on the teats and inflammation of the mammary tissue. Though not striking, the results obtained supported the general view.—N. S. BARRON.

VAN RENSBURG, S. W. J. (1942). **Streptococcus Mastitis in Heifers.**—*J. S. Afr. vet. med. Ass.* **13.** 37–42. **1329**

The author records his experiences with mastitis control in three herds. In one the infection of the cows was almost 100%, and the infection of first-calf heifers was over 80%. These heifers were kept completely away from contact with the cows. In a second herd which was moderately infected, about 20% of first calves were infected. In a third herd kept under experimental conditions, 20 in-calf heifers being purchased from various sources for its establishment, no infection had appeared, at the time of writing, either in the heifers or their progeny, a number of which were then lactating. The author expresses the view that in combating mastitis, if clean herds are to be established, they will have to be recruited from calves fed on clean milk, either mastitis free or pasteurized. He is inclined to the view that infection can occur in calves *per os* in spite of the failure to produce the disease by this route in adult cows.—E. M. ROBINSON.

I. MALCOLM, J. F., KING, C. W., & CAMPBELL, M. M. (1942). **The Value of the Cell Content and Electrical Conductivity of Milk as Criteria of Bovine Mastitis.**—*Proc. Soc. agric. Bact., 1942.* pp. 30–34. [Only abst. given]. **1330**

II. WATTS, P. S. (1942). **Field Observations on the Control of Contagious Mastitis.**—*Ibid.* p. 35. [Only abst. given]. **1331**

III. SOULIDES, D. A. (1942). **A Note on the Use of a Composite Medium for the Detection of** *Streptococcus agalactiae*.—*Ibid.* p. 36. [Only abst. given]. **1332**

I. For routine diagnosis of mastitis, a combination of culture, cell count and electrical conductivity tests is advocated. As there is a close correlation between electrical conductivity and chloride content the chloride test has been discontinued. The value of the cell content and electrical conductivity tests was demonstrated by a series of experiments in which the presence or absence of infection was judged by cultures. When a standard of 500,000 cells or over per ml. was taken as an indication of infection, the cell count test gave the same result as culture in about 90% of 1,282 samples of milk examined. For conductivity tests, bulk samples of milk from a herd in which mastitis was established were used. About 72% of specimens were correctly diagnosed. When all three tests were used on 42 samples from known infected quarters, only 74% were positive to culture, compared with 90% to the conductivity test and 93% to the cell content test. With the conductivity and cell count tests the stage of lactation must be considered. False results are given by colostrum and the milk of late lactation.

II. Attempts to control contagious mastitis in the field have shown the importance of secondary factors, such as milking machines, in raising the infection rate. Analysis of 45,000 tests revealed that the infection rate in one group of herds milked by one type of machine was 14%, and in a second group, milked by another type of machine, 40%. In two herds, substitution of one type of machine for another led to a drop in the infection rate in six months from 89 and 79% to 45 and 42% respectively. Machines should milk at 13 lb. pressure or less and at about 38 pulsations per min.

III. In order to differentiate colonies of *Streptococcus agalactiae* in plated samples containing a mixed flora, the use is advocated, as a post-plating measure, of a single composite broth such as that suggested by DAVIS & ROGERS [*V. B.* **11.** 73]. Several modifications of the medium have been made by S.; these are fully described.—D. D. OGILVIE.

KORONNYĬ, A. V. (1942). Materialy k izucheniyu patogeneza sibirskoĭ yazvy. [**Pathogenesis of Anthrax**].—*Zh. Mikrobiol., Moscow.* No. 7. pp. 105–112. **1333**

Basing his observations on the changes which gradually occur in anthrax bacilli and in the blood of infected rabbits (anisocytosis, poikilocytosis, hyperchromasia, polychromasia, appearance of normoblasts, slight leucocytosis, neutrophilia and a shift to the left in the Schilling count), and also in bacilli grown in washed erythrocytes and in blood serum, K. describes the effect of the erythrocytes on the course of anthrax infection. In his opinion, capsulation of anthrax bacilli, which should be regarded as the first sign of disintegration of the bacilli, occurs under the influence of the erythrocytes. The products of the disintegration in their turn reduce the haemoglobin to non-reversible methaemoglobin. Death in anthrax infection is due to lack of oxygen. Prolonged action of the disintegration products causes haemolysis. K. claims to have obtained, by ether extraction of large numbers of bacilli, small amounts of lipoid substances which acted *in vitro* upon erythrocytes in the same way as bacilli. The spleen is regarded as a predilection site for the concentration and development of the bacilli.—A. MOLDAWSKY.

MCKAY, W. M. (1943). **Congenital Tuberculosis in Bovines.**—*Vet. J.* **99.** 47–53. **1334**

A description is given of 18 cases considered by the author to be congenital TB. of cattle in Banffshire. Twelve were clinically affected, four appeared healthy at slaughter, and two were foetuses. Both foetuses were aged about six months; the other cases occurred in animals two months to three years old. [Lesions in the substance of the spleen were regarded as conclusive evidence of congenital infection. The significance of such lesions is not fully established.]—D. D. OGILVIE.

*AEHNELT, E. (1941). Tuberkulose und Tuberkulinisierung bei Ziegen. [**TB. and Tuberculin Testing of Goats**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 172]. **1335**

A total of 411 goats was submitted to the intradermal tuberculin test with old tuberculin as well as synthetic medium tuberculin and to the complement-fixation test; reactors to the tuberculin tests were killed and examined. It was concluded that the allergic test with old tuberculin was the most reliable, as there were fewer doubtful reactions with it than with synthetic medium tuberculin. The c.-f. test was relatively unreliable.

Sixteen of the above goats were tuberculous and both bovine and human types of infection were said to be involved.

VERGE, J., & SENTHILLE, F. (1942). Fréquence des différents types du bacille de Koch dans la tuberculose du porc. [**Frequency of Occurrence of Different Types of Tubercle Bacilli in Swine**].—*C. R. Soc. Biol. Paris.* **136.** 495–496. **1336**

Eighteen pig carcasses condemned in the Paris abattoirs were examined bacteriologically by Löwenstein's method. Bovine type tubercle bacilli were isolated from 12 and *Corynebacterium equi* from the rest.—C. L. CLARK.

FREUND, J., & GOTTSCHALL, R. Y. (1942). **Standardization of Tuberculin with the Aid of Guinea Pigs Sensitized by Killed Tubercle Bacilli in Liquid Petroleum.**—*Arch. Path.* **34.** 73–74. **1337**

The authors claim that, for tuberculin standardization, g. pigs sensitized with killed human tubercle bacilli suspended in liquid paraffin may be substituted for g. pigs sensitized by infection with virulent bacilli. They found the most satisfactory method of inducing a high degree of sensitivity to be that of giving three deep intramuscular injections, each of 0·2 ml. of a liquid paraffin suspension containing 10 mg. of heat-killed (30 min. at 100°C.) organisms per ml., into the back of the necks of g. pigs. Such g. pigs became highly sensitive and were suitable for tuberculin standardization one month after injection of the killed bacilli. This sensitization, which was at least as good as that induced by infection with virulent organisms, was maintained for at least six months. Since the degree of sensitization was apparently related to body weight, g. pigs of 800 g. weight or more were used.

The advantages claimed for this method of sensitization are (1) the elimination of the use of tuberculous animals, (2) the greater uniformity of the sensitizing agent, (3) the fact that the sensitized animals can be used repeatedly, and (4) the convenience of keeping the antigen for a long period of time.—J. LOCHIEL MCGIRR.

ARENA, A. R. (1942). Importancia de la tuberculosis bovina y su relación con la epidemiología humana. [**Bovine TB. and its Relation to Human TB. in the Argentine**].—*Gac. vet., B. Aires.* **4.** 103–115. **1338**

This article gives statistics of the incidence of bovine TB. in the large refrigerating plants in Buenos Aires and Santa Fé, from 1910–1940. During 1940, an average of 7·28% of bovine carcasses in Buenos Aires,

and 8·78% in Santa Fé were found to be infected with local or generalized TB. This is higher than the figure obtaining in the U.S.A. in 1917 (4·9%) before the eradication of tuberculous cattle began. A. advises the immediate initiation of an eradication campaign in cattle.—ISOBEL W. BURTON.

DU TOIT, C. J., & BUCHANAN, G. (1942). **Tuberculous Meningitis of Bovine Origin. Report of a Case.**—*S. Afr. med. J.* **16.** 10–11. **1339**

In spite of the common occurrence of TB. in cattle there has been only one previously recorded case of bovine type TB. in human beings in South Africa. The authors isolated, by g. pig inoculation, a strain of *Mycobacterium tuberculosis* from the spinal fluid of a child with symptoms of meningitis. The organism proved to be markedly dysgonic and in all its cultural characteristics was a typical bovine strain. By inoculation of rabbits the organism proved to have the virulence of the bovine type.—E. M. ROBINSON.

GRIFFITH, A. S. (1942). **The Cultural Characters and Pathogenicity for Some Laboratory Animals of the Vole Strain of Acid-Fast Bacillus.**—*J. Hyg., Camb.* **42.** 527–531. **1340**

The primary colonies of the vole strain of acid-fast bacillus on egg media bear some resemblance to colonies of tubercle bacilli, but they differ in their much slower growth, sometimes taking four weeks or longer to become visible to the naked eye. There is no growth, or only scanty growth, on glycerin media in primary culture. The organism has a characteristic morphology, curved forms being abundant.

Cultures are pathogenic for the rabbit, g. pig, and rat, but not for the fowl. In the rabbit, a relatively large dose given intravenously may cause death from acute miliary lesions resembling those of TB. Smaller doses produce trivial lesions and the bacilli die out gradually. Doses of 0·1 or 1 mg. given intraperitoneally to g. pigs may cause death from generalized disease. The lesions, however, are retrogressive, and may heal completely if the initial dose is small. In the rat, intraperitoneal inoculation is followed by lung lesions resembling those produced by mammalian type TB.—ISOBEL W. BURTON.

LOVELL, R. (1943). **The Source of Corynebacterium pyogenes Infections.**—*Vet. Rec.* **55.** 99–100. Discussion p. 100. **1341**

The question is discussed whether the origin of *Corynebacterium pyogenes* infection is the sudden appearance, through contagion, of the organism in a susceptible host or the resuscitation, by some secondary factor, of the organism already in the host. Evidence is presented which largely supports the second view, though the first view is supported in the case of summer mastitis and pyometra of bovines. In the former flies are the carriers. The latter condition may result from over-frequent manipulation of the genital tract in the course of sterility work and possibly by interference with the oestral cycle. An alum-precipitated toxoid has been prepared and is undergoing a field trial. Cows receive two doses of 10 ml. subcutaneously with an interval of 6–8 weeks.—D. D. OGILVIE.

I. VAN ES, L. (1941). **Swine Erysipelas and some of its Problems.** pp. 12. Lincoln, Neb.: State of Nebraska Bureau of Animal Industry. [8vo]. **1342**

II. VAN ES, L., & MCGRATH, C. B. (1942). **Swine Erysipelas.**—*Res. Bull. Neb. agric. Exp. Sta.* No. 128. pp. 43. [Revised Edit. of *Res. Bull.* No. 84]. **1343**

III. VAN ES, L. (1942). **Swine Erysipelas Infection in Man.**—*Ibid.* No. 130. pp. 34. **1344**

I. An address to practitioners in Nebraska, mentioning the possible causes of the occasional vaccination "breaks" seen when using the serum-culture method. The variations in potency of different batches of serum, and a consequent imbalance between culture and serum, are discussed, and recommendations as to the time and dosage of vaccination are given. A second dose of culture, 14 days after the first simultaneous injection, is recommended, and it is suggested that pigs should be vaccinated almost as soon as farrowed, and not in batches of varying ages.

II. An excellent account of the disease, with a bibliography of 103 references, dealing with historical considerations, aetiology, epizoology, clinical features, morbid anatomy, diagnosis, prophylaxis, therapy, and, very briefly, the disease in other animals and man. There is an account of the application of sero-vaccination in Nebraska, and a discussion of the small number of unsatisfactory results obtained.

III. A monograph, with a bibliography of 115 references, giving a detailed account of the disease in man, dealing with the sources of infection, epidemiology, clinical features, pathological anatomy, diagnosis, prognosis, therapy and prophylaxis.—E. COTCHIN.

ZAHARIJA, I. (1940). Uticaj homolognog seruma na klice b. erysipelatos suis. [**The Action of Homologous Antiserum on** *Erysipelothrix rhusiopathiae*].—*Jugoslov. vet. Glasn.* **20.** 331–340. [German summary]. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 308]. **1345**

Broth cultures were mixed with homologous antiserum of unstated potency in the proportions of 1 : 9 and 1 : 18, left to stand for variable periods, and then the bacteria were removed and injected in a dose corresponding to 2 M.L.D. of the fresh culture into mice and pigeons. Results seem to have varied greatly, but it was concluded that pure antiserum is not bactericidal, but that carbolized serum is bactericidal when the mixture is kept at 37° C.

These results suggest that in swine erysipelas immunization work it is permissible to mix culture and serum beforehand, provided that they are kept at ordinary cool temperatures.

—. (1942). Auftreten von "Schweineseuche" ("Lungenseuche") in den besetzen Ostgebieten und deren Bekämpfung. [**Occurrence and Control of** *Pasteurella suiseptica* **Infection in Pigs in the Eastern Occupied Territories**].—*Z. Schweinez.* **49.** 412. **1346**

A record of loss from acute pasteurellosis (bronchopneumonia) in two trainloads of pigs transported from Germany to the eastern occupied territories is followed by a commentary by a veterinary consultant on the nature of this disease.—J. E.

*WRAMBY, G., & FREDRICSON, M. (1941). [**Pseudotuberculosis in a Pig**].—*Skand. VetTidskr.* **31.** 590. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 191]. **1347**

A case record of *Pasteurella pseudotuberculosis rodentium* infection in a pig. The organism was pathogenic for g. pigs and rabbits but almost apathogenic for a piglet.

VERGE, J., & PLACIDI, L. (1942). Pseudo-tuberculose chez le singe. [*Pasteurella pseudotuberculosis* **Infection in Monkeys**].—*C. R. Soc. Biol. Paris.* **136.** 483–484. **1348**

A case record of *Past. pseudotuberculosis* infection in a *Macacus rhesus* in Marseilles zoo. The lesions are described as well as the bacteriological work.

CONN, H. J. (1942). **Validity of the Genus Alcaligenes.**—*J. Bact.* **44.** 353–360. **1349**

An attempt was made to differentiate between the intestinal and soil organisms, at present placed in the

genus *Alcaligenes* in BERGEY'S "Manual of Determinative Bacteriology." *A. radiobacter* was taken as an example of the soil forms, and *A. faecalis* as an example of the intestinal form. On a synthetic medium containing glucose, the soil forms grew vigorously, but *A. faecalis* cultures grew poorly or not at all. Abundant CO_2 was produced by the soil organisms from synthetic media, with or without yeast extract. The intestinal parasites did not produce an appreciable amount.

C. recommends reserving the genus *Alcaligenes* for the intestinal inhabitants, and proposes the formation of a new genus, *Agrobacterium*, for the soil and plant organisms. A description of the new genus is given.
—ISOBEL W. BURTON.

BARTEL, H. (1942). Salmonella-Mischinfektionen. **[Mixed Salmonella Infection in Animals].**—*Tierärztl. Rdsch.* **48.** 351–352. **1350**

The occurrence of two or more salmonella types infecting a single individual is probably more frequent than is usually recognized. A table listing the results recorded in 16 articles is given here, as well as 14 further instances in which mixed cultures were recovered from animals. The organisms concerned, and the animals infected, were as follows :– *S. cholerae-suis* var. *kunzendorf* plus *S. typhi-murium* (two pigs) ; *S. cholerae-suis* var. *kunzendorf* plus *S. dublin* (one pig) ; *S. typhi-murium* plus *S. dublin* (four calves, one young bovine, four adult cattle) ; *S. dublin* plus *S. newport* (one calf) ; *S. typhi-murium*, rhamnose negative plus *S. typhi-murium* rhamnose positive (one duck).

The method of recognition of mixed infection must vary according to the organisms concerned. If organisms of different subgroups are involved, they may be recognized by testing single-colony cultures against pure O sera ; or, the mixed culture may be inoculated into broth containing O serum against one of the organisms, and single colonies examined from cultures made from the upper part of the broth culture. If the two organisms are of the same subgroup, 10 ml. of melted agar may be mixed with 20 ml. of broth, and 0·6 ml. of a particular H standard serum added ; the mixed culture is inoculated at a point at the centre of the plate, and cultures are made 24 hours later from the colonies that grow away from the centre. Further information may be given by culturing on arabinose- or dulcite-rhamnose plates, with bromthymol-blue as an indicator.—E. C.

MALLMANN, W. L., RYFF, J. F., & MATTHEWS, E. (1942). **Studies on the Salmonella Group—Methods of Isolation and Pathogenicity of Strains Occurring in the Intestines of Chickens.**—*J. infect. Dis.* **70.** 253–262. **1351**

A total of 204 birds was examined in this study and the following media were used for routine cultivation. For enrichment :– tetrathionate broth, brilliant green liver-infusion broth. For direct examination by smears on plating from enrichment :– bismuth sulphite agar, MacConkey's agar, brilliant green liver-infusion agar.

From the intestinal tracts of 48 of these birds, 72 strains of organisms belonging to the salmonella group were isolated. Thirty-five of the strains were *S. pullorum*, but 22 birds carried salmonella organisms other than *S. pullorum*. The following species were isolated from the intestinal contents or faeces of chickens :– *S. aberdeen*, *S. give*, *S. california*, *S. worthington*, *S. oranienburg*, *S. paratyphi* B, *S. new brunswick*, *S. urbana*, *S. hvittingfoss*, *S. muenchen*, and *S. pullorum*. None of the strains isolated showed any pathogenicity for monkeys when fed in large doses.—R. F. GORDON.

*HEGYELI, Z. (1942). Infektionsversuche mit der Kultur und des Kulturfiltrates des Bacterium suipestifer Kunzendorf. **[Infection Trials with Culture and Culture Filtrates of *Salmonella cholerae-suis* var. *kunzendorf*].**—*Arch. wiss. prakt. Tierheilk.* **77.** 187–199. **1352**

Experiments are described showing that feeding living cultures of *S. cholerae-suis* var. *kunzendorf* to pigs 4–12 months of age, which were susceptible to swine fever, led to severe illness, and sometimes death, with patchy discoloration of the skin and diphtheritic inflammation of the stomach and intestines. Further experiments showed that a filtrate from a 48-hour culture (whether or not the culture was shaken for 24 hours before filtering) was toxic to pigs when injected intravenously, and led to splenic infarction and haemorrhages in the skin, peritoneum, pleura, lymph nodes, kidney, and bladder, and to haemorrhages and necrosis in the intestinal mucosa ; it was noticed that, if the pigs had been previously immunized against S.F., the results of injecting the filtrate were much less severe, and recovery occurred in a few hours. The question whether *S. cholerae-suis* forms an endotoxin or an exotoxin was left unanswered.—E. COTCHIN.

—. (1941). **The National Poultry Improvement Plan.** —*Misc. Publ. U.S. Dep. Agric.* No. 300. pp. 28. [Revised Edit.] **1353**

The objectives of the National Poultry Improvement Plan are :– (1) to improve the production and breeding quality of poultry ; (2) to reduce the mortality of chicks from pullorum disease ; (3) to identify breeding stock, hatching eggs, and chicks, with respect to quality, by describing them in terms uniformly accepted in all parts of the country ; (4) to serve as a means through which scientific research may be applied for the improvement of poultry and poultry products.

The plan is nation-wide, but participation is optional on the part of the states and of members of the industry within the states. There are five progressive breeding stages, and four progressive pullorum control and eradication classes.

The four classes of the pullorum-disease control and eradication are :– (1) U.S. pullorum-tested class. All birds to be used for breeding stock must be tested when more than five months old and the flock must contain fewer than 9% reactors in 1941–42, fewer than 8% in 1942–43 and so on to fewer than 5% in 1945–46 and the following years. (2) U.S. pullorum-controlled class. All chickens to be used as breeders must be tested when over five months of age, the flock must contain less than 2% of reactors. (3) U.S. pullorum-passed flocks. All chickens on the premises to be tested when more than five months of age, and the flocks must contain no reactors. (4) U.S. pullorum-clean class. All chickens to be used as breeders must be tested when more than five months old ; the flock must contain no reactors in two consecutive tests made not less than six months apart.

The general provisions for all classes are the same. The testing must be carried out under the supervision of an official state agency, and testing must be by one of the following agglutination tests :– (a) the standard tube agglutination test ; (b) the stained-antigen, whole-blood test, or (c) the rapid serum test. The essential features of these three tests as described in the original articles are given *verbatim* in the appendix [see SCHAFFER *et al.*—*V. B.* **2.** 4 ; ANON—*V. B.* **4.** 561 ; RUNNELLS *et al.*—(1927). *J. Amer. vet. med. Ass.* **70.** 660].

Matters relating to disease are under the direction of the livestock sanitary authorities, of the officials of the state college of agriculture, or similar state agency in co-operation with the Bureau of Animal Industry, U.S. Department of Agriculture.—R. F. GORDON.

GORDON, R. F. (1942). **The Practical Application of the Rapid Whole Blood Agglutination Test for Pullorum Disease.**—*Vet. Rec.* **54.** 495–497. **1354**

A full description of the procedure is given, together with illustrations of the apparatus. This is made up in cabinet form and consists of a flat-sided hot water container on which a white plate, ruled in 16 1½-in. squares, is laid. A glass shield is provided to give protection to the antigen from wind, dust, etc., and the body of the cabinet contains drawers to hold the necessary instruments and apparatus.

When in use the cabinet is supported on a stout tripod. In addition, a necessary piece of equipment is a collapsible metal crate having four compartments, each just large enough for an adult bird to crouch in and each fitted with a hinged lid but no bottom. The extra compartments are included so that the birds may be identified when the results of the tests are known.

The test is carried out by mixing 0·02 ml. of blood, collected from a punctured wing vein by means of a nichrome wire loop of 3 mm. diameter, with 0·04 ml. of stained antigen. A positive reaction is obtained within 2 min.—N. S. BARRON.

OLITZKI, L. (1942). **Comparative Studies on *Salmonella* Strains Isolated in Palestine from Camels and a Human Being.**—*J. Hyg., Camb.* **42.** 547–548. **1355**

Three strains of *S. kentucky* isolated from camels with enteritis, and one strain from a human case of diarrhoea, differed from the original strain isolated from a chick by EDWARDS [*V. B.* **8.** 692.] in failing to form acid or gas from *m*-inositol, and in showing only slight acid-production in 3–5 days on semi-solid agar containing 1% glycerol. The antigenic formulae of these camel and human strains were the same as for the chick strain, viii. xx. : i_d : z_6.—E. COTCHIN.

FLEISCHHAUER, G. (1942). Zur Kotuntersuchung auf Enteritiskeime. [**Faecal Examination for Salmonella Organisms**].—*Berl. Münch. tierärztl. Wschr.* Oct. 2nd. 299. **1356**

The value of BIERBRAUER's enrichment medium [*V. B.* **10.** 495.] is enhanced if brilliant green + phenol red or malchite green + phenol red plates are inoculated at the end of 24, 48, and 72 hours' incubation.—E. C.

MASON, J. H. (1942). **Gas Gangrene in the Dog.**—*J. S. Afr. vet. med. Ass.* **13.** 31–36. **1357**

Experience seems to show that the dog has a high natural resistance to gas gangrene. M. inoculated strains of *Clostridium welchii, Cl. septicum, Cl. histolyticum, Cl. oedematiens*, and *Cl. chauvoei* intramuscularly into dogs and produced gas gangrene. In the course of other experiments on an ulcerative disease of the gums, lips and cheeks of young dogs, cultures of the same anaerobes were inoculated intradermally into the lips and were given *per os*. The results of the experiments showed quite definitely that the dog is susceptible to artificial infection with the commoner gas gangrene organisms, but does not show a high degree of susceptibility.—E. M. ROBINSON.

THOMSON, A., & ROSS, H. E. (1943). **An Enterotoxaemia in Goats.**—*Vet. Rec.* **55.** 127. **1358**

A case of *Clostridium welchii* Type D infection in a goat is described. The animal showed colic and diarrhoea and died 21 hours after the onset of illness. Autopsy revealed acute congestion of the duodenum and patches of inflammation throughout the rest of the small intestine. Both kidneys were swollen and moderately pulpy. The heart showed numerous sub-endocardial haemorrhages. Diagnosis was made by bacteriological examination and neutralization tests. The herd was treated with pulpy kidney serum. No further cases occurred. It is presumed that six previous deaths in the same herd were also due to *Cl. welchii*, Type D infection.—D. D. OGILVIE.

NAGLER, F. (1940). Experimentelle Untersuchungen über die serologischen Eigenschaften des Fraenkelschen Gasbazillus (B. perfringens). III. Mitteilung. [**Experimental Investigation of the Serological Properties of *Clostridium welchii*. III**].—*Z. Immun-Forsch.* **97.** 273–280. **1359**

It was found that *Cl. welchii* Type A toxins were only produced in quantity in culture media containing pieces of liver tissue. Twelve-hour cultures contained much *zeta* toxin, but only a little *alpha* toxin, and when this was investigated it was found that both toxins are produced in equal quantity during the first few hours and that after a time the *alpha* toxin is destroyed whilst the *zeta* toxin remains. The cause of this was not determined.

Separation of the two toxins by precipitation with Na_2SO_4 or $(NH_3)_2SO_4$ was difficult and not very successful, and both toxins were soon destroyed in the process. [Note : British workers call the German *alpha* and *zeta* toxins "*theta*" and "*alpha*" toxins respectively.]—J. E.

HAYWARD, N. J. (1942). **The Use of Benzidene Media for the Identification of *Clostridium oedematiens*.**—*J. Path. Bact.* **54.** 379–382. **1360**

H. grew a wide variety of species of anaerobes on Gordon and McLeod's benzidene medium in order to see whether the blackening of the medium by colonies was a reliable indication of *Cl. oedematiens*.

The blackening reaction specifically produced by hydrogen peroxide formation was given by all four strains of *Cl. oedematiens*, but also by some strains of *Cl. multifermentans, Cl. cochlearium* and an unidentified species, probably a *Bacteroides*. Contrary to findings reported earlier [see *V. B.* **11.** 157.], the few anaerobic streptococci tested and a single strain of *Cl. botulinum* were non-reactors.

Another type of blackening which, however, is not visible by transmitted light and is due to proteolytic activity, was given by several species including *Cl. sporogenes, Cl. sordellii, Cl. multifermentans*, and *Cl. bifermentans*. This undesired reaction can be avoided by the use of unheated benzidene blood agar. Both *Cl. oedematiens* and *Cl. multifermentans* produced variant colonies which failed to produce hydrogen peroxide although they were otherwise typical of their respective species. Tests showed that the presence of benzidene in the medium neither lessened the growth-promoting properties for *Cl. oedematiens* nor reduced the viability of colonies when they were exposed to air. It is concluded that in the use of this medium, a positive reaction does not definitely indicate only one species, and that variant colonies of *Cl. oedematiens* may fail to react.

[As the primary isolation of *Cl. oedematiens* from a mixture of anaerobes is often difficult, the exclusion of this medium because of its lack of finality, is not warranted in the routine examination of such material.]
—J. KEPPIE.

PIRINGER, W. (1941). Ueber experimentelle Tetanusbazillämie. [**Experimental Tetanus Bacillaemia**].—*Zbl. Bakt. I. (Orig.).* **147.** 35–43. **1361**

A hundred mice were inoculated with cultures of *Clostridium tetani*, as detailed below, and 93 which died or were killed were examined for the presence of the bacillus in remote site. Of 68 mice which died, the bacillus was isolated from 28, being found 25 times in the spleen, five times in the heart muscle, and seven times in the brain ; of the 25 killed, the bacillus was isolated from only six cases, four times from the spleen, three times from the heart muscle, and twice from the brain. Of the 93 mice, 57 (39 killed, 18 died) had been inoculated with pure cultures, and the bacillus was isolated from cultures of the organs of 14 of these. The

remaining 36 (29 died, 7 killed) were inoculated with a mixed culture rich in tetanus bacilli, and 20 of these gave positive cultures from the organs. P. suggests that there are indications that a bacillaemia is also more frequent in man than is usually considered to be the case.—J. G. CARR.

I. IPSEN, J. (1941). **Progress Report on Production of Tetanus Test Toxoid.**—*Bull. Hlth Org. L.o.N.* **9.** 447–451. **1362**

II. IPSEN, J. (1941). **Comparison of Tetanus Test Toxins Prepared by Seven Institutes from the Same Strain and by the Same Method.**—*Ibid.* 452–475. **1363**

I. Details were collected of how each of 12 laboratories (widely scattered throughout the world) prepared tetanus toxin, and a comprehensive table shows interesting comparative data on such subjects as growth medium, conditions of incubation, and methods of preserving the test toxin. The technique and medium, which were chosen for use in a world-wide experiment because of their simplicity, are given. To a carefully prepared heated extract of veal in distilled water were added 0·5% NaCl and 1·0% Witte peptone. This was inoculated with a reliable strain using a fixed procedure, and the toxin was precipitated and dried after six days' incubation. The M.L.D. was about 0·00006 mg., and the L+/5 (mice i.v.) about 0·10 mg.

II. An instructive and helpful paper for those involved in the routine assay of tetanus antitoxins. It is already too condensed to permit of a complete abstract because of the numerous protocols and theoretical explanations.

Seven batches of toxin, each prepared in a different laboratory from the same strain of *Clostridium tetani* and by the same method, were examined to ascertain qualitative differences, if any. In seeking a sound basis for the comparison of the toxins, the author has revised the methods of estimating such values as the M.L.D., the slope of the reaction curve, and the potency of antitoxins. It is explained that observation of the death time of the test animals is more reliable than the use of the mortality rate of a group, and the use of the former in the given mathematical equation forms an exact basis for the computation of the M.L.D. and the error involved.

Similar values for the above-mentioned toxins were obtained by the several tests. This supports the assumption, not entirely proven, that the strain is the predominating factor influencing the quality of a tetanus toxin. The typing of strains of *Cl. tetani* according to their toxin is advocated. The further problem of qualitative differences in antitoxins is mentioned and the importance of using the most accurate method for antitoxin assay is stressed.—J. KEPPIE.

CLIFTON, C. E. (1942). **The Utilization of Amino Acids and Related Compounds by *Clostridium tetani*.**—*J. Bact.* **44.** 179–183. **1364**

Carbon dioxide and hydrogen production by washed suspensions of 20-hour cultures of *Cl. tetani* (strain E-35) in the presence of the more common amino acids, glucose, glycerol, and certain non-amino acids was determined at 37°C. by the Warburg technique.

Glutamic and aspartic acids and serine were attacked, carbon dioxide, ammonia, acetic and butyric acids being the main decomposition products. Appreciable amounts of lactic acid and alcohol were also produced from aspartic acid. Essentially similar products were produced during the dissimilation of pyruvic and fumaric acids, malic acid being an additional product in the case of fumarate utilization. Glucose was not attacked. The "Strickland reaction" was not involved in the metabolic activities of *Cl. tetani*. [*Cl. sporogenes* and *Cl. botulinum* utilize amino acids primarily by means of the "Strickland reaction", a coupled oxidation-reduction between pairs of different amino acids.]
—J. LOCHIEL MCGIRR.

TIKHOMIROV, A. A. (1942). K voprosu o serologicheskoĭ klassifikatsii B. botulinus reaktsieĭ agglyutinatsii. Predvaritel'noe soobshchenie. [**Serological Classification of Agglutination Reactions to *Clostridium botulinum*. Preliminary Communication**].—*Zh. Mikrobiol., Moscow.* No. 7. pp. 91–96. **1365**

T. reviews the serological subgroups within the Types A and B of *Cl. botulinum*. He considers that the serological classification of this organism is unsatisfactory and emphasizes that strains used for the preparation of high-grade antitoxin to be used for typing strains should be proved to be monovalent and carefully studied before they are adopted for use. Toxin-antitoxin neutralization tests are only useful for the typing of toxic strains. Other methods of typing are required.
—A. MOLDAWSKY.

ROSKVAS, O. N. (1942). K voprosu ob izmenenii biologicheskikh svoĭstv botulinovovo toksina pri khranenii. [**Changes in Properties of *Clostridium botulinum* Toxin During Storage**].—*Zh. Mikrobiol., Moscow.* No. 7. pp. 96–98. **1366**

G. pigs inoculated with seven M.L.D. of old *Cl. botulinum* toxin prepared 18 months previously succumbed earlier than those inoculated with freshly prepared toxin. Out of seven sensitized g. pigs which received old toxin and on the following day horse serum intracardially, three succumbed from anaphylactic shock and four from botulism, whereas out of seven sensitized and inoculated with freshly prepared toxin, six succumbed from anaphylaxis and only one from botulism.—A. MOLDAWSKY.

LOTZE, J. C., & BOWMAN, G. W. (1942). **The Occurrence of *Bartonella* in Cases of Anaplasmosis and in Apparently Normal Cattle.**—*Proc. helminth. Soc. Wash.* **9.** 71–72. **1367**

Bartonella infection has been found occasionally in cattle affected with anaplasmosis at the Beltsville Research Centre. The parasites resembled the bacilliform or paired cocciform structures found in bartonella of the rat. The height of infection usually occurred 2–4 days before the appearance of the anaplasms. Since these bartonella bodies were not found in all cattle affected with anaplasmosis, it was assumed that they were not a form of anaplasm, and as their occurrence was detected in a splenectomized calf which was free from anaplasms, it is suggested that the aetiological agent of anaplasmosis interferes temporarily with the host's defence mechanism against bartonella.—U. F. R.

SHAHAN, M. S., & DAVIS, C. L. (1942). **The Diagnosis of Actinomycosis and Actinobacillosis.**—*Amer. J. vet. Res.* **3.** 321–329. **1368**

The authors made a bacteriological and histological study of 78 animals with "actinomycosis" (73 cattle, four sheep, and one pig) and they indicate the features which enable the differentiation to be made of actinobacillosis from actinomycosis and either of these from somewhat similar lesions produced by staphylococci (botryomycosis), tubercle bacilli, *Coccidioides immitis*, and by *Corynebacterium pyogenes* or other pyogenic bacteria. Actinobacillosis was diagnosed in 68 animals and actinomycosis in 11, both organisms being isolated from one animal. Involvement of the lymph nodes was confined to actinobacillosis. In six animals with actinomycosis the bones were involved, whereas in the other five the lesions were in the soft tissues (lung, reticulum, mucosa of frontal sinus, submaxillary salivary gland).

The distribution of the lesions is given in a table and there are excellent photomicrographs, including one of coccidioidal granuloma which shows a periphery of clubs surrounding a central spherule.—E. G. WHITE.

FOSHAY, L., & MADDEN, A. G., Jr. (1942). **The Dog as a Natural Host for** *Blastomyces dermatitidis*.—*Amer. J. trop. Med.* **22.** 565–569. **1369**

This is believed to be the first recorded case of spontaneous generalized *Blastomyces dermatitidis* infection in dogs.

A two-year-old dog showed multiple subcutaneous abscesses all over the body. The elbows and the hind legs were greatly swollen. Pain was intense and the dog lost weight rapidly. The abscesses did not burst and the animal died after three weeks.

P.M. lesions consisted of multiple cutaneous and subcutaneous abscesses and consolidation of the lungs, enlarged spleen and liver, and multiple small abscesses in the parenchymatous organs and intestine. The organism was demonstrated in the pus.

Short accounts of the morphology and cultural characters of the mould are given.—M. H. KYAW.

ASHBURN, L. L., & EMMONS, C. W. (1942). **Spontaneous Coccidioidal Granuloma in the Lungs of Wild Rodents.**—*Arch. Path.* **34.** 791–800. **1370**

Lung lesions which were considered to be coccidioidal granulomas were found in nine of 105 rodents trapped in the desert around San Carlos, Arizona. Most of the lesions were about 1 mm. in diameter and the centre of some of them was necrotic; they were markedly proliferative in character, with epithelioid cells in the centre and a peripheral zone of lymphocytes. Fungi were present in all the lesions examined, but the formation of endospores was seen in only two animals, both of which were pocket mice (*Perognathus*). The chronic nature of the lesions and the fact that very few of the fungi were mature and contained endospores suggest an inhibiting influence of the host on maturation and this may be of importance in relation to infection of man from reservoir hosts.

[Calcified pulmonary lesions occurring in Indians in the arid regions of Arizona may be due to infection with *Coccidioides immitis*. Such individuals fail to react to the tuberculin test, but a large proportion react to the intracutaneous injection of coccidioidin. (See ARONSON, SAYLOR, & PARR—1942. *Arch. Path.* **34.** 31).]
—E. G. WHITE.

WARREN, J., & SABIN, A. B. (1942). **Some Biologic and Immunologic Characteristics of a Pleuropneumonia-Like Microörganism of Human Origin.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 24–26. **1371**

A brief account of a pleuro-pneumonia-like microorganism, isolated from the human cervix uteri. It was apparently non-pathogenic for mice on intravenous inoculation.

Immune serum, prepared in rabbits, agglutinated the homologous organism to a dilution of 1 : 1,000, but failed to agglutinate representative types of pleuropneumonia-like organisms from the mouse and rat.
—ISOBEL W. BURTON.

KLIENEBERGER, E. (1942). **Some New Observations Bearing on the Nature of the Pleuropneumonia-like Organism Known as L1 Associated with** *Streptobacillus moniliformis*.—*J. Hyg., Camb.* **42.** 485–497. **1372**

The life-cycle of the L1 organism is essentially different from that of a bacterium. L1 starts its development from filtrable elementary corpuscles, which develop, and multiply by segmentation, following changes in the "nuclear apparatus." Eventually reproductive corpuscles are formed. This life-cycle seems to justify the classification of L1 with the pleuropneumonia group and not with the bacteria. K. believes that this peculiar reproductive process provides strong evidence in favour of the conception that *Streptobacillus moniliformis* (*Asterococcus muris*) is composed of two genetically different microbes, a streptobacillus and the L1 organism. Cross-absorption tests between the two organisms seem to indicate that they are antigenically dissimilar.—ISOBEL W. BURTON.

KRISTENSEN, M. (1940). Recherches sur la fermentation mutative des bactéries. [**Changes in Fermentation Properties of Bacteria**].—*Acta path. Microbiol. scand.* **17.** 193–231. [In French]. **1373**

K. reviews the subject and then describes his own work with a "unicellular" culture of *Salmonella dublin*. The strain originally failed to ferment *l*-arabinose, but acquired this property under suitable conditions.—J. F.

*MONOD, J. (1942). Recherches sur la croissance des cultures bactériennes. [**Research on the Growth of Bacterial Cultures**]. pp. 211. 65 figs. Paris: Hermann. [Fr. 80]. [Abst. from abst. in *Bull. Inst. Pasteur.* **40.** 241]. **1374**

This book describes the author's investigations into the conditions governing bacterial multiplication in cultures, with special reference to the influence of sugars. The first part deals with growth in the presence of a single sugar, under conditions such that limitation of O_2 is not a limiting factor. The organisms studied were *Bacterium coli*, *Salmonella typhi-murium*, and *Bacillus subtilis*. The total growth was independent of the concentration of sugar, but the rate of growth depended on the concentration, tending to a limiting value at low concentrations. In some cases this limit, which depends on the nature of the sugar, is reached only at very low concentrations indeed.

The second part deals with the two phases of growth, separated by an interval, sometimes seen when two sugars are present [see also *V. B.* **12.** 336.]. This phenomenon is now termed *diauxie*. M. suggests that sugars which show this effect are attacked by adaptive enzymes formed after the first sugar is completely consumed by the constituent enzymes.—J. G. C.

GALE, E. F., & EPPS, H. M. R. (1942). **The Effect of the** *p*H **of the Medium during Growth on the Enzymic Activities of Bacteria** (*Escherichia coli* **and** *Micrococcus lysodeikticus*) **and the Biological Significance of the Changes Produced.**—*Biochem. J.* **36.** 600–618. **1375**

The enzymes of *Bacterium coli* and *M. lysodeikticus* were found to fall into two main groups according to the type of variation they exhibited with alteration of pH of the growth medium. In group I were those enzymes for which a compensatory formation occurred as the medium pH deviated from the optimum activity pH, the net result being that the effective activity remained approximately constant. This group included such enzymes as catalase, urease, fumarase and formic dehydrogenase. In group II were those enzymes which exhibited their maximum development as the medium pH approached the optimum enzyme pH. The deaminases and decarboxylases were particularly prominent in this group, the former being produced in response to an alkaline, and the latter in response to an acid, growth medium.

In general terms, the enzyme changes produced by alterations in the environmental pH were such that (1) an attempt was made to counter the external change, and (2) certain essential activities were maintained at a constant level.—J. LOCHIEL MCGIRR.

EPPS, H. M. R., & GALE, E. F. (1942). **The Influence of the Presence of Glucose during Growth on the Enzymic Activities of *Escherichia coli*: Comparison of the Effect with that Produced by Fermentation Acids.**—*Biochem. J.* **36.** 619–623. **1376**

The presence of glucose in the medium during the growth of *Bacterium coli* was found to suppress the formation of certain enzymes, particularly deaminases. This agent was apparently quite unrelated to the pH changes produced by fermentation acids and disappeared when growth was again allowed to take place in the absence of fermentable carbohydrate.—J. L. MCGIRR.

GALE, E. F., & VAN HEYNINGEN, W. E. (1942). **The Effect of the *p*H and the Presence of Glucose during Growth on the Production of α and θ Toxins and Hyaluronidase by *Clostridium welchii*.**—*Biochem. J.* **36.** 624–630. **1377**

This study of *Cl. welchii* Type A was initiated in an attempt to establish (1) the optimum pH of the medium for the production of α and θ toxins and hyaluronidase, and (2) the part played by glucose in the medium in the production of these substances. The organisms (strain S 107) were grown in a peptone-salt-beef extract medium with and without glucose: the pH was stabilized in each case at various values within the growth range 5·5–8·5.

The production of α and θ toxins and hyaluronidase per mg. dry weight of organism was found to vary with the age of the culture, being small in young cultures and increasing to a maximum at the time when active cell division ceased. In the absence of glucose, θ toxin production per mg. dry weight of organism reached a maximum with a medium pH of 7·5: glucose increased the yield of toxin at all pH values and shifted the growth pH for maximum production to 8·0. In the absence of glucose α toxin production reached a maximum at medium pH 6·0: in the presence of glucose the maximum production occurred at medium pH values 7·0–7·5. The formation of hyaluronidase per mg. dry weight of organism was least when the medium pH was 7·0 and increased as the medium pH became more acid or alkaline.—J. LOCHIEL MCGIRR.

See also absts. **1542** (cocci), **1518**, **1519** (anthrax), **1484**, **1544–1548** (salmonella), **1520** (*Past. pestis*), **1521** (brucella), **1436** (tularaemia), **1430** (general), **1510–1514** (antibacterial agents), **1515** (sulphonamide resistance).

DISEASES CAUSED BY PROTOZOAN PARASITES

BELTRAN, E. (1939). Investigación protozoológica de la sangre de 276 aves de mercado en la Ciudad de Mexico. [**Examination of 276 Birds from Mexico City Market for Blood Protozoa**].—*Rev. Inst. Salubr. Enferm. trop. Mex.* **1.** 67–72. **1378**

All of 127 fowls, 107 turkeys, and 45 pigeons examined microscopically for blood protozoa were negative.—J. E.

*PAVLOV, P., & GUENEV, C. (1941). Ricerche su un ceppo di Trypanosoma evansi Steel, riscontrato in Bulgaria. [**A Strain of *T. evansi* Isolated from a Horse in Bulgaria**].—*Riv. Parassit.* **5.** 235–239. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 46]. **1379**

Attempts were made to infect rabbits, g. pigs, white mice and rats, pigs, goats, grey squirrels, and pigeons with a strain of *T. evansi* isolated from a horse in Bulgaria [see also *V. B.* **9.** 692]. No infection was established in pigs or goats. Occasional infections were recorded in pigeons, whilst g. pigs were readily infected, and in these animals antenatal infection was demonstrated in an aborted foetus, and young born to infected mothers were immune.—U. F. RICHARDSON.

*GEURDEN, L. M. G., & WILLEMS, A. E. R. (1941). [**Pathogenesis of Bovine Trichomonad Pyometra**].—*Vlaam. Diergeneesk. Tijdschr.* **10.** 17–24. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 318]. **1380**

The authors suggest that trichomonads penetrate into the uterus at the time of copulation and multiply there after placentation, producing a poison which acts on the embryo and its membranes. The embryo dies and may be either aborted, or retained with a condition of pyometra. The influence which decides the result as between abortion and pyometra may be the corpus luteum or may be the number of trichomonads.

The uterine contents in various stages of pyometra are described. It appears that the trichomonads are all killed since the pus is usually sterile. In pyometra the cotyledons are attacked by the suppurative process and may be destroyed, and the uterine mucous membrane is damaged beyond repair.

KERR, W. R. (1942–43). **Trichomoniasis in the Bull.** [I] & II.—*Vet. J.* **98.** 209–217, and **99.** 4–8. **1381**

The symptomatology is discussed and also the distribution of the parasite in the organs.

For diagnosis the agglutination test does not give as good results in bulls as in cows, and the principal methods available are the indirect method by investigation of the clinical history and the detection of infection in cows, the brush and cannula method of examining the preputial sheath, the examination of the genitalia under epidural anaesthesia, and observation of the results of mating with a virgin heifer.

The value of the various drugs used for treatment is discussed. Tests were made of the lethal action of certain drugs by subjecting suspensions of trichomonads in peptone-saline to various concentrations for 1 min., immobility of the trichomonads being taken as the end-point of the readings. With 1% acriflavine, brilliant green, or gentian violet, or 2% lactic acid, 25% of the trichomonads were still active after 1 min., but with 0·02% iodine or 0·2% merfenil, no organisms were motile.—U. F. RICHARDSON.

MORGAN, B. B. (1942). **Inoculations with *Trichomonas foetus* (Protozoa) in White Rats and Mice.**—*Proc. helminth. Soc. Wash.* **9.** 68–71. **1382**

Suspensions of *T. foetus* from cultures, or in pyometra material from a cow, failed to produce infection when inoculated intraperitoneally or intravaginally into white rats, nor did any mortality result. In white mice, intravaginal inoculation failed to produce infection. In two groups of 35 and 10 mice inoculated intraperitoneally with the heaviest dose used, the mortality was 48 and 50% respectively, the material in one case being culture suspension and in the other pyometral fluid. In nine inoculated intraperitoneally, multiplication of the trichomonads could be shown during the first 18 hours.—U. F. RICHARDSON.

I. SABIN, A. B., & RUCHMAN, I. (1942). **Characteristics of the Toxoplasma Neutralizing Antibody.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 1–6. **1383**

II. SABIN, A. B. (1942). **Toxoplasma Neutralizing Antibody in Human Beings and Morbid Conditions Associated with it.**—*Ibid.* 6–10. **1384**

III. WARREN, J., & SABIN, A. B. (1942). **The Complement Fixation Reaction in Toxoplasmic Infection.**—*Ibid.* 11–14. **1385**

I. If toxoplasma-infected mouse brain is injected intracutaneously into the back of a rabbit, a characteristic

lesion develops, but if the brain is mixed with a serum which contains a toxoplasma-neutralizing antibody, and then injected, the lesion is less pronounced in a degree proportional to the strength of the antibody. Utilizing this fact, the authors have shown that a toxoplasma-neutralizing antibody appears in the blood of rhesus monkeys two weeks after infection, that it is destroyed by exposure for 30 min. to a temperature of 56° C., that it is destroyed in 1–2 weeks at a temperature of 5°C., and that it can be preserved for months in an insulated box packed with solid CO_2. The antibody persists in monkeys for at least 14 months, whether or not there is a concomitant chronic infection of the parasite. Rabbits, mice, cats, and dogs did not develop appreciable quantities of antibody after infection.

II. Sera of infants and children presenting various morbid conditions were tested by the technique described in I.

III. The test for toxoplasma-neutralizing antibodies mentioned in I and II, has the disadvantages that a virulent toxoplasm strain must be maintained by animal passage, and that the results of the test are not known for a week; consequently, an easier and more rapid test was sought. A saline suspension of toxoplasma-infected rabbit brain was made and alternately frozen in a mixture of solid CO_2 and alcohol and thawed. The supernatant liquid was used as antigen in a complement-fixation test as follows:– 0·2 ml. of antigen was mixed with 0·2 ml. of toxoplasma-immune serum (inactivated by heating to 56°C. for 30 min.) and 0·2 ml. of complement (fresh g. pig serum or commercial lyophilized g. pig serum), and incubated at 37°C. for 30 min.; 0·4 ml. of a mixture consisting of equal parts of a 5% suspension of washed sheep erythrocytes and haemolysin (2 units per 0·2 ml.) was then added and the whole incubated for a further 30 min.; the final reading was taken after an overnight incubation in the refrigerator. The antigen fixed complement specifically in the presence of immune sera from experimentally infected rhesus monkeys, but not from rabbits, dogs, and cats. The complement-fixing antibody appeared in infected monkeys within 1–4 weeks after inoculation, but unlike the neutralizing antibody it disappeared again in most monkeys, sometimes within two months. The authors believe that although a positive complement-fixation reaction does not in all cases indicate active or even recent infection, the test may have its greatest usefulness in the rapid diagnosis of active toxoplasmosis. —D. G. Davey.

Pires, A. (1942). Contribución al estudio de una vacuna contra la espiroquetosis aviar preparada en embriones de pollo. **[Vaccination against Avian Spirochaetosis with Chick-Embryo Vaccine].**—*Gac. vet., B. Aires.* **4.** 115–118. **1386**

A vaccine against avian spirochaetosis was prepared by inoculating virulent blood into 12-day-old chick embryos. After five days' incubation, the amniotic fluid, chorio-allantoic membrane, lungs, liver, and heart of the embryos were macerated in saline, formolized, and filtered through gauze. The resulting suspension, inoculated intramuscularly, gave complete protection against experimental infection with *Spirochaeta gallinarum*.—Isobel W. Burton.

Reihart, O. F., & Lacy, A. M. (1942). **The Public Health Importance of Leptospirosis.**—*N. Amer. Vet.* **23.** 662–664. **1387**

Up to 1935, only 12 proven cases of Weil's disease had been recorded in man in the U.S.A. and Canada, but 40 human cases have been diagnosed by the U.S. Public Health Service in the last four years. Leptospirosis due to *L. canicola*, of which the dog is a reservoir, is difficult to diagnose in man since in its clinical manifestations it resembles influenza and is not generally associated with jaundice. Recently 40 out of 105 dogs in Pennsylvania gave serological evidence of leptospirosis, and in other countries 2–46% of the dog population shows residual leptospiral infection.—U. F. R.

Savino, E., & Rennella, E. (1942). El cultivo de la *Leptospira icterohaemorrhagiae*, Inada e Ido, 1915. I.—Condiciones y factores que rigen su desarrollo *in vitro*. Metodo para la cuenta de leptospiras. II.—Nuevo medio de cultivo. **[Cultivation of *L. icterohaemorrhagiae*. I & II].**—*Rev. Inst. bact., B. Aires.* **11.** 5–18. **1388**

The authors describe a method of counting leptospira in culture by means of a modification of the Thoma-Zeiss haemocytometer. They applied this method in the estimation of the optimum concentrations of the various ingredients in a medium for growing *L. icterohaemorrhagiae*.

Sheep or rabbit serum, lysed rabbit red blood corpuscles, yeast autolysate, and casein hydrolysate all favoured growth, while haematin was found to be an essential growth factor.

The optimal medium consists of K_2HPO_4, 2 g.; NaCl, 3 g.; $MgSO_4$, 0·05 g.; $CaCl_2$, 0·01 g.; distilled water, 1 litre. Hydrochloric acid is added to bring the pH to 7·1 and the solution is diluted 1 : 50 in distilled water. Sterilization is carried out at 115°C. for 15 min.

To this basic medium are added 10% sheep serum (sterilized by filtration), 0·005% haematin, 0·1% yeast autolysate, and 0·5% casein hydrolysate. The optimum osmotic pressure for growth of *L. icterohaemorrhagiae* is 1·45–3·62 atm.—Isobel W. Burton.

See also absts. **1434, 1523-1525** (trypanosomiasis), **1522** (toxoplasms), **1367** (anaplasmosis), **1568** (biology of protozoa), **1569** (parasite immunity).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Markham, R., Smith, K. M., & Lea, D. (1942). **The Sizes of Viruses and the Methods Employed in their Estimation.**—*Parasitology.* **34.** 315–352. **1389**

This article contains a critical analysis of the validity of various methods employed for the estimation of the size of small particles. It is considered that the method of electron microscopy, since it represents the most direct means of finding the size of a virus and is, therefore, least subject to error due to the necessity of interpreting measurements by theoretical formulae, will probably give the most exact data. Other methods of determining the size of small particles are discussed, such as X-ray diffraction, sedimentation and diffusion, filtration, especially through graded collodion discs, and radiation inactivation. Two particularly valuable tables are given showing the estimated size of animal and plant viruses respectively, as determined by a variety of methods. The article should be consulted in the original by those interested.—R. E. Glover.

Dervichian, D. (1942). Sur les dimensions des micro-organismes considérées à l'échelle moléculaire. **[Size of Micro-Organisms considered on the Molecular Scale].**—*Ann. Inst. Pasteur.* **68.** 422–425. **1390**

The constituent particles of certain filtrable viruses are individual molecules, and the conformation of a virus is closely connected with its molecular structure. Some calculations are given showing the sizes; on

the molecular scale, of some micro-organisms in comparison with other substances. Attention is drawn to the complicated structure of micro-organisms, it being suggested that the constituent molecules are arranged in two and sometimes three dimensions. A very great variety of complex forms and appearances is encountered.—J. C. BUXTON.

SIMMS, H. S., & SANDERS, M. (1942). **Use of Serum Ultrafiltrate in Tissue Cultures for Studying Deposition of Fat and for Propagation of Viruses.**—*Arch. Path.* **33.** 619–635. **1391**

The ultrafiltrate from blood serum has been shown to contain a substance which stimulates the growth of dormant adult tissue *in vitro* and which appears to be essential for the maintenance of living adult cells. The complicated method of preparing this serum ultrafiltrate is described in great detail. Special diluting fluids have also been devised and the pH is adjusted with carbon dioxide. Various tissues (the total volume of which must not exceed 1% of the "mother fluid") were added, depending on the virus to be inoculated. Influenza and various encephalomyelitis viruses have been cultivated by this method; high titres are produced and the virus is obtained almost free from extraneous protein.—J. F.

THOMPSON, R. L., & COATES, M. S. (1942). **The Effect of Temperature upon the Growth and Survival of Myxoma, Herpes, and Vaccinia Viruses in Tissue Culture.**—*J. infect. Dis.* **71.** 83–85. **1392**

The effect of incubation at different temperatures on the survival of the three viruses was determined by growing selected strains in a modified Maitland's medium. Serial dilutions of the cultures were tested on suitable animals.

Cultures of myxoma virus were assayed in the rabbit skin. High titres were obtained when incubation had been between 32° and 37°C. and low values after incubating at 40°C.: loss in infectivity occurred after 42·2°C. Cultures of herpes virus were tested intracerebrally in mice with a failure to survive after 40°C.: maximum yield occurred after incubation at 35°C. The three strains of vaccinia tested gave similar results. The greatest concentration occurred after incubation at between 34° and 35°C.: above 37°C. there was a progressive decline although some virus was still detectable, with two strains, at 45°C.—R. E. GLOVER.

PEARCE, J. M. (1942). **Susceptibility of the Heart of the Rabbit to Specific Infection in Viral Diseases.**—*Arch. Path.* **34.** 319–333. **1393**

Intratesticular inoculation of vaccinia, pseudorabies, inflammatory fibroma, strain A fibroma, and myxoma viruses into rabbits previously rendered susceptible by intravenous inoculation of acacia solution, was followed by the appearance of cardiac lesions in the majority of the animals. Cardiac lesions were either absent or of minor intensity in animals not prepared by inoculation with acacia solution.

Lesions were generally situated in the myocardium, but the vaccinia, pseudorabies and inflammatory fibroma viruses occasionally produced inflammation of the auriculo-ventricular valves. Intranuclear bodies were found in the acute exudative lesions of pseudorabies. The myxoma virus induced proliferation of typical large myxomatous cells, and the fibroma virus induced proliferation of characteristic fibroblasts. The vaccinia and inflammatory fibroma viruses brought about a less specific picture of muscle necrosis and leucocytic exudation.—ISOBEL W. BURTON.

I. BULLOUGH, W. S. (1942). **The Starling (*Sturnus vulgaris* L.) and Foot-and-Mouth Disease.**—*Proc. roy. Soc.* Ser. B. **131.** 1–12. **1394**

II. BULLOUGH, W. S. (1942). **Starling Movements and the Spread of Foot-and-Mouth Disease.**—*Nature, Lond.* **149.** 683–685. **1395**

I. STOCKMAN & GARNETT (1923) considered several species of birds as possible carriers of F. & M. disease. B. selected the starling for special study because it is the only species closely associated with cattle in large numbers. It is stated that, although the starling is not susceptible to F. & M. disease, it could transmit it mechanically over long distances.

The majority of starlings coming from Norway, where F. & M. disease is rare, go to Scotland, but of 563 coming from other parts of Europe where the disease is frequent, only four were found in Scotland. The peak of the incidence recorded each month of unexplained outbreaks of F. & M. disease in the United Kingdom is earlier in the eastern than the western counties and it is suggested that this is dependent on the western migration of the birds across the country. The occurrence of unexplained outbreaks above 600 ft. and of starling roosts at this altitude is rare. The incidence of unexplained outbreaks of F. & M. disease according to B.'s study of the years 1900–37 bears a closer relationship to the migration of starlings than it did for the years 1900–22 according to the investigations of STOCKMAN & GARNETT. There is a remarkable correlation between the number of roosting starlings and the number of unexplained outbreaks of F. & M. disease [this may be more important than the correlation with the maximum period of migration with which there is not such exact agreement].

Starlings migrate to Sweden in the summer and in that country the incidence of F. & M. disease is much higher in the summer than in the winter.

[B. says "the observations and correlations here set forward constitute the most circumstantial of evidence" and one is perhaps justified in mentioning evidence which suggests that the starling is not an important factor in the spread of F. & M. disease. ECCLES (*V. B.* **10.** 755.) carried out extensive experiments in the subject and was not able to detect virus on birds from infected premises. Despite apparently ideal conditions it was extremely difficult to produce F. & M. disease in susceptible animals by flying starlings or pigeons directly from boxes containing animals in various stages of the disease. Whilst the insusceptibility of the pigeon and starling was established, and it was considered unlikely that pigeons and starlings play much part in the spread of F. & M., E. admitted that there may be certain strains of virus more easily transmitted by birds. Other workers (*V. B.* **9.** 703.) also concluded that birds and other animals played little part in the spread of F. & M. disease. This negative experimental evidence is not, however, fully convincing because the existence of "epidemic strains" of, say, influenza virus with enhanced infectivity is generally recognized and only a small proportion of human volunteers develop influenza after inhaling an infective spray (see *V. B.* **13.** 166). J. T. EDWARDS (*V. B.* **6.** 656.) found that in the hedgehog the primary lesions of F. & M. disease were in the nasal mucosa and lung and that they were in fact very similar to those of influenza, but as in influenza it was difficult to produce disease in animals by means of an infective spray. It is probable that in cattle also F. & M. is primarily a respiratory infection and indeed its extreme infectivity could hardly be explained unless, like influenza, droplet infection were one of the main methods of spread.]

II. This is a condensation of I.—JOHN FRANCIS.

LEVADITI, C. (1942). Une souche neurotrope du virus de la fièvre aphteuse. **[A Neurotropic Strain of Foot and Mouth Disease Virus].**—*C. R. Soc. Biol. Paris.* **136.** 477–478. **1396**

L. reports his experiences with a strain of F. & M. disease virus which had undergone 805 passages through mouse brains. It was regularly lethal to mice in 1–2 days after transcranial inoculation at a dilution of 10^{-1} and retained some virulence up to a 10^{-5} dilution.

The lesions produced were well defined, affecting the cerebral cortex and especially the hippocampus, and consisted of infiltration of polynuclear leucocytes, lysis and extensive oxyphilic action on the neurones, and also a vacuolization of the surrounding substance. There was total liquefaction of the middle layer of the hippocampus. None of several sulphonamides had any curative effect.—C. L. CLARK.

*MELLWIG, H. (1941). Untersuchungen über die Schutz- und Simultanimpfung bei der Maul- und Klauenseuche im Kreise Hannover. **[Immunization against Foot and Mouth Disease in Hanover District].** —*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 173]. **1397**

M. observed the effects of the use of Riems immune serum and convalescent serum in about 1,000 herds threatened with F. & M. disease in 1938. The disease occurred in 7·5% of the inoculated herds within 14 days of treatment, and even so the treatment was considered to have had a good effect on the whole.

Results of a few trials of simultaneous immunization with Riems serum plus artificial infection were very varied and not on the whole favourable.

FLÜCKIGER, G. (1942). Die Anwendung der Schutzimpfung bei der inskünftigen Bekämpfung der Maul- und Klauenseuche. **[Future Use of Immunization against Foot and Mouth Disease].**—*Schweiz. Arch. Tierheilk.* **84.** 361–379. **1398**

F. reviews the problem of F. & M. disease in Switzerland. Assuming an average loss in value per infected bovine of 50%, he gives a table showing numbers of cattle and sheep infected each year from 1886–1941. The totals come to 1,180,467 affected cattle, there being a total loss in value of close on 567 million francs, and 656,500 sheep with a loss of 33 million francs.

The worst outbreak in Switzerland was that of 1919–21 when 370,000 cattle were infected. In the last outbreak of 1937–39 only 150,000 or 15% of all the cattle were infected. This is ascribed to the use of formolized adsorbate vaccine which enabled barriers of immunized cattle to be formed. Vaccine was obtained from Italy, Germany and Denmark and was given to about half a million animals.

The value of the vaccine having been demonstrated, the next task is to provide facilities for its preparation in adequate amount. This has been done by the creation of a vaccine plant at Basle, where 200, or at pressing need 500 litres of monovalent vaccine can be produced daily. This amount is considered sufficient against average risks and provided that adequate warning of approaching infection is received. A good international warning system is still needed. The type of infection prevalent should be known early if such a warning system were in operation, so that usually there would be time to provide a vaccine specific against the type likely to be encountered. As vaccine only keeps for six months and as artificial immunity only lasts for nine months, it is necessary to carry on vaccine production all the time.

A warning is given against ideas that the existence of an effective vaccine makes it possible to dispense with police control methods: these are still of paramount importance and must not be relaxed at all.—J. E.

—. (Undated). **Rabies. A Challenge to Humane America.** pp. 21. Rabies Committee Southern Veterinary Medical Association. [8vo]. **1399**

A leaflet issued by the Association to enlist the co-operation of animal owners in the control of rabies.

JOHNSON, H. N. (1942). **The Significance of the Negri Body in the Diagnosis and Epidemiology of Rabies.** —*Illinois med. J.* **81.** No. 5. Reprint pp. 19. **1400**

J. reports the results of a series of observations on dogs and foxes with the object of assessing the value of microscopic examination for the diagnosis of rabies. Of 771 dog brains (suspected cases of rabies) examined over one year in Alabama, 690 were positive by mouse inoculation and 623 of them were positive microscopically, *i.e.* 10·5% of these cases of rabies were Negri negative.

404 fox brains obtained casually and including some from an outbreak of rabies in foxes were also examined. 128 were positive, 116 of which were Negri positive, giving an error of 10%. All the mouse positive and Negri negative cases were foxes concerned in the outbreak.

Brains of vaccinated dogs which died of rabies after natural infection in Alabama were similarly examined. 92 were mouse positive and 14% of these were Negri negative.

Of 188 dogs which died of rabies during vaccination experiments, 39·7% were Negri negative, these being mostly dogs affected with paralytic rabies. In the experiments, the period of incubation and the period of clinical illness were the same in both vaccinated and control groups (21 and 2½ days respectively), showing that the vaccination had not even any delaying action against the virus. In this work some evidence was found that Negri body production varies according to the strain of virus.

The article concludes with a useful discussion on the latter and kindred problems.—J. E.

BRONSHTEĬN, N. I., & ZAK, O. S. (1942). Sravnitel'noe izuchenie shtammov fiksirovannovo virusa beshenstva nekotorykh pasterovskikh stantsiĭ. **[Comparative Study of Different Strains of Fixed Rabies Virus].**—*Zh. Mikrobiol., Moscow.* No. 7. pp. 81–85. **1401**

The authors investigated the changes which occurred in fixed virus after many years' passaging in different laboratories, applying the same methods of examination to five industrial strains, *viz*, Moscow, Ivanova, Tomsk, Tbilisi, and Tashkent. Whereas no sharp and essential differences were found in the first four strains regarding M.L.D. and infectiveness by various routes of inoculation for laboratory animals, the Tashkent strain was found to be highly virulent and unstable, thus being unsuitable for use. The Ivanova strain was found to be extremely resistant to drying, losing its virulence only after ten days. 70·6% of mice immunized by Fermi's vaccine prepared from the Moscow strain survived infection as compared with 16·6% of the controls. Fermi's vaccine and Phillips' vaccine, prepared from the Ivanova strain, conferred immunization on 81·8% and 94·4% of mice respectively, only 9·12% of controls resisting infection. In a course of immunization lasting for 25 days, immunity in rabbits against not more than 3–5 M.L.D. was set up. From the tenth day the rabbit sera showed the presence of antibodies; after the 25th day, sera from the majority of the rabbits neutralized 20 M.L.D. in a dilution of 1 : 10. Rabbits immunized with the Moscow and Tbilisi strains in some cases showed a decrease of antibodies towards the 25th day.—A. MOLDAWSKY.

TEBYAKINA, A. E. (1942). Rol' kratnosti privivok, prodolzhitel'nosti privivochnovo kursa i dozirovki vaktsiny v immunitete k beshenstvu. **[Effect of Number of Inoculations, Duration of Course of**

Vaccination, and Dose of Vaccine on Rabies Immunity].—*Zh. Mikrobiol., Moscow.* No. 7. pp. 86–88. **1402**

Experiments were conducted on nine groups, each containing ten g. pigs immunized with ten-day-old Fermi vaccine. It was found that daily vaccination with heavy doses for a short period was much more effective than vaccination with the same quantity of vaccine at intervals, or daily inoculations of 1 ml. for 21 days.

—A. MOLDAWSKY.

TEBYAKINA, A. E. (1942). Rol' heterogennoĭ tkani v immunitete beshenstvu. [**Role of Heterogeneous Tissue in Rabies Immunity**].—*Zh. Mikrobiol., Moscow.* No. 7. pp. 88–91. **1403**

Contrary to observations made with tissue vaccines in distemper, the presence of heterogeneous tissue in carbol and formol rabies vaccines did not influence the formation of immune bodies in mice and g. pigs.

—A. MOLDAWSKY.

WEBSTER, L. T., & CASALS, J. (1942). **A Non-Virulent, Single-Dose Rabies Vaccine for Prophylactic Immunization of Dogs.**—*J. exp. Med.* **76.** 185–194. **1404**

Experiments were performed to study the comparative immunizing power of a commercial phenolized, a commercial chloroformized, and an irradiated rabies vaccine prepared in the laboratory. The last vaccine was shown to be superior to the other two and when it was given in large doses of a total of 30–40 ml., singly or in repeated doses, or as a single injection of 5·0 ml. of a concentrated vaccine, strong immunity was produced. Phenolized vaccine appeared to be the least potent of the three.

There appeared to be very little to choose between the subcutaneous and intraperitoneal routes of inoculation of the irradiated vaccine.—M. H. KYAW.

*LEACH, C. N., & JOHNSON, H. N. (1942). **Effect of Prolonged Storage on the Antigenicity of Chloroform-Inactivated Canine Rabies Vaccine.**—*Amer. J. publ. Hlth.* **32.** 1380–1382. **1405**

The authors demonstrated that chloroform-inactivated rabies vaccine was still of high antigenic value 16½ months after the preparation of the vaccine when stored at refrigerator temperature.—M. H. KYAW.

LEVADITI, C. (1942). Association entre ultravirus, rage et louping ill. [**Association between Rabies and Louping-Ill Viruses**].—*C. R. Soc. Biol. Paris.* **136.** 474–475. **1406**

When a mixture of louping-ill and rabies viruses was inoculated intracranially into eight mice, all died in 6–8 days with lesions of louping-ill and none of rabies (absence of Negri bodies). The same results were produced after serial passage through mice.

In a second series of similar experiments with a mixture of the viruses lesions of louping-ill were found in all the mice, and Negri bodies in three, but on subsequent passages there was a complete absence of Negri bodies. The louping-ill virus had caused the rabies virus to die out.—C. L. CLARK.

LÉPINE, P., LEVADITI, J. C., & GIUNTINI, J. (1942). Détermination par ultracentrifugations comparatives de la densité du virus vaccinal. [**Density of Vaccinia Virus determined by Comparative Ultracentrifugation**].—*Ann. Inst. Pasteur.* **68.** 432–435. **1407**

The authors stress the fact that a knowledge of the density of particles is indispensable to the application of formulae, as defined by Stokes' law, for calculating the size of viruses by ultracentrifugation. The results of their work show that there is no appreciable correction to be made to their previous article [*V. B.* **13.** 14.] concerning virus density, but that in the vaccinial suspensions used, there formed, apart from the virus, "normal" corpuscles which it was possible to obtain by the same process from the allantoic membrane of the egg. These normal corpuscles showed an affinity for sedimentation different from, and inferior to, that of vaccinial corpuscles. Further work along the same lines is contemplated.—J. C. BUXTON.

DUNHAM, W. B., & MACNEAL, W. J. (1942). **Culture on the Chick Chorio-Allantois as a Test of Inactivation of Vaccinia Virus.**—*J. Bact.* **44.** 413–424. **1408**

The failure to produce vaccinia lesions upon the chorion-allantois of the inoculated chick embryo was taken as the criterion for the inactivation of the vaccinia virus.

A comparative study showed that vaccinia virus remained active for at least six hours in Tyrode's solution, distilled water, 25% alcohol in Tyrode's solution, or 25% alcohol in water. But the virus was inactivated in less than 1 min. in liquor antisepticus (United States National Formulary, Interim Revision, 1939). Some constituents of liquor antisepticus, when employed individually, inactivated the virus after longer periods of time, but the action of each of these was much less potent than that of liquor antisepticus itself.

—M. H. KYAW.

LOZOVAYA, A. N. (1942). K etiologii grippoznykh vspyshek i eksperimental'nye materialy po adaptatsii grippoznovo virusa k novym vidam zhivotnykh. [**Aetiology of Influenza Epidemics and Experiments on the Adaptation of Influenza Virus to New Species of Animals**].—*Zh. Mikrobiol., Moscow.* No. 7. pp. 69–71. **1409**

L. studied the virulence, tissue cultivation, serological identification, and P.M. effects in mice of two newly isolated strains of influenza virus which proved to be closely related to those described by SMITH, ANDREWES, & LAIDLAW. It was found that the virulence, adaptation, and ability to produce lung lesions in mice gradually increased during repeated passages.

Among the various species of animals tested, cats and hamsters were found susceptible to infection; this is regarded as of importance from the epidemiological standpoint. Lung lesions could be produced in hamsters even after a few passages of the virus, but during hibernation the lungs were found to contain virus (inoculation of mice by emulsion) without showing lesions.—A. MOLDAWSKY.

HYDE, R. A. (1942). **Behavior of Influenza A Virus in the Rabbit, Rat, and Guinea Pig.**—*Amer. J. Hyg.* **36.** 338–353. **1410**

Influenza A virus was passaged in the rabbit and g. pig as an inapparent infection; the experiments were well controlled. Antibodies were produced in both animals following intraperitoneal inoculation of virus and in the g. pig also following intranasal inoculation.

The virus could not be passaged in rats, although it was antigenic both by the intraperitoneal and intranasal routes in these animals.—JOHN FRANCIS.

FRANCIS, T., Jr., & SALK, J. E. (1942). **A Simplified Procedure for the Concentration and Purification of Influenza Virus.**—*Science.* **96.** 499–500. **1411**

Influenza virus was introduced into the allantoic fluid of hen's eggs, containing embryos 11–12 days old. After 48 hours' incubation, the blood vessels were opened and allowed to bleed into the fluid. The mixture was removed, and chilled to increase adsorption of the virus on to the red blood corpuscles. The latter were centrifuged off, washed in saline, and incubated for 2½ hours at 37°C. in $\frac{1}{10}$th of their volume of normal saline. The virus was thus released, and could be removed in the supernatant fluid after centrifugation.

In this manner, tenfold concentrations of fully infective virus could be obtained.—ISOBEL W. BURTON.

SCHAEFFER, M. (1942). **Preparation of Purified Influenza Virus.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 32–34. **1412**

Epidemic influenza virus in mouse lung was purified by ultrafiltration of the tissue through 2% collodion-acetate membranes, after preliminary clearing by filtration through paper pulp. Salk's technique of purification by adsorption on calcium phosphate, modified by substituting the above technique for the final dialysis, resulted in a product containing only about 1·5% of the associated inactive nitrogenous material. The loss of virus activity was only slight, and immunologic properties were apparently unimpaired. Preliminary experiments with proteolytic enzymes indicated that they might possibly be used in the purification of influenza virus.—ISOBEL W. BURTON.

EATON, M. D., & MARTIN, W. P. (1942). **An Analysis of Serological Reactions after Vaccination and Infection with the Virus of Influenza A.**—*Amer. J. Hyg.* **36.** 255–263. **1413**

Antibody studies by neutralization tests in mice and by complement fixation were performed on a group of human beings some of whom were vaccinated with an active tissue culture of the virus of influenza A and some with a mixture of formalinized influenza A and distemper vaccine. These vaccines both produced an active immunity, but it was not so great as that following natural infection.

The behaviour of vaccinated and unvaccinated persons was studied during an epidemic of influenza. Cases of clinical influenza occurred with equal frequency in persons with low, medium, or high antibody titres, but in the latter group there was a relatively lower incidence of influenza A and a higher incidence of influenza of undetermined aetiology as judged by neutralization and complement-fixation tests. It was shown, however, that persons who had high antibody titres before infection or vaccination were less likely to show an increase in antibodies by c.-f. or neutralization tests than persons with low initial titres. No type B influenza was found during the outbreaks studied, but in view of the above observation it seems premature to postulate, on serological evidence, the existence of a form of influenza of unknown aetiology which occurs in epidemic proportions coincident with an epidemic of influenza A.—JOHN FRANCIS.

STEIN, C. D., OSTEEN, O. L., & MOTT, L. O. (1941). **A Resumé of Studies and Observations on Infectious Anaemia, or Swamp Fever of Horses, carried on by the Bureau of Animal Industry from 1935 to 1940.** pp. 9. Washington, D.C.: Pathological Division, Bureau of Animal Industry, U.S. Department of Agriculture. [4to] [Mimeographed]. **1414**

Studies on the virus of E.I.A. have shown that it is specific for Equidae. Although its virulence is very variable there is no multiplicity of types. The virus withstands freezing and drying but is destroyed by heating at 57°–60°C. for an hour.

The method of infection in the natural state is still obscure. Recently, the disease was transmitted by intimate contact in a stable from which flies were excluded. Under ordinary stable conditions, however, no tendency to spread has been noticed. The disease has also been experimentally transmitted by the injection of an extract of *Strongylus* species from an infected horse.

For diagnosis, encouraging results have attended preliminary trials with antigens prepared from acetone-precipitated serum globulins and with virus-free lyophile serum globulins derived from the blood of infected horses.

All attempts to immunize horses against the disease have failed. No drug tested so far has had any curative effect.

The control measures which are advocated include isolation of infected animals, disinfection of harness, improvement of stable hygiene, control of flies, and avoidance of infected mares for breeding purposes.
—D. D. OGILVIE.

WRIGHT, F. H. (1942). **Antibodies in Human Serum which Neutralize the Viruses of Equine Encephalomyelitis. Experience with the Intraperitoneal Mouse Protection Test.**—*Amer. J. Hyg.* **36.** 57–67. **1415**

By means of mouse-protection experiments, sera from 89 individuals, in the majority of whom some form of encephalitis had been suspected, were tested against one or both strains of E.E. virus. All but two of the subjects had been victims of recent disease of the central nervous system.

Of 74 sera tested for the Eastern strain of virus, five protected mice against more than 10,000 intraperitoneal M.L.D. of virus. Of 75 tested for the Western strain, ten protected mice against a similar dose. Sera which failed to protect against 10 M.L.D. were regarded as negative. All the sera which at first gave protection intermediate between 10 and 1,000 M.L.D. shifted into the positive or negative group on re-testing. Tests for cross protection between the heterologous virus strains were negative in all instances.
—ISOBEL W. BURTON.

MCNUTT, S. H., & PACKER, A. (1943). **Isolation of Western Equine Encephalomyelitis and Hog-cholera Viruses from Supposedly Hog-cholera Immune Swine.**—*Vet. Med.* **38.** 22–25. **1416**

Swine fever and E.E. viruses were isolated from the tissues of two pigs from a herd of 56 which had been vaccinated against the former disease by the serum-virus method, the rest of the herd having remained healthy and these two pigs having become ill at 40 and 44 days respectively after vaccination.

From the tissues of the first pig, *Salmonella cholerae-suis* was isolated and a suspension of liver and spleen from this carcass caused no symptoms after subcutaneous or intraperitoneal inoculation into rabbits and into pigs immune to S.F., but when inoculated subdurally into rabbits and g. pigs, it caused death in 24–48 hours, with an accompanying streptococcal invasion. A brain suspension from one of these inoculated rabbits together with a liver suspension from the original pig caused, after six days, symptoms of S.F. in two susceptible pigs. The disease was checked in one pig by the administration of antiserum; the other died and lesions of S.F. were found at autopsy.

Examination of the second original pig showed S.F. to be present and also revealed the existence of an infective agent which was subsequently shown to be the virus of Western E.E. All attempts, however, to infect adult pigs artificially with Western E.E. virus failed, but the virus was isolated from the brain of a three-day-old pig which had been infected experimentally.

The authors emphasize that an inadvertent infection of the tissues with Western E.E. virus could not have occurred in the laboratory.—J. C. BUXTON.

WATSON, E. A., & PLUMMER, P. J. G. (1942). **Distemper Inclusion Bodies.**—*Amer. J. vet. Res.* **3.** 350–357. **1417**

In the course of work, extending over a number of years, on distemper, the authors studied the inclusion bodies in the tissues of experimentally infected ferrets

and foxes as well as in naturally infected foxes and mink. Typical cytoplasmic inclusions were frequently found in both naturally and experimentally infected animals and only occasionally in animals which had no contact with the distemper virus. The inclusions were most common in the transitional epithelium of the urinary tract, they were occasionally present in the epithelial cells of the intra- and extrahepatic bile ducts, and none was found in the brain, trachea, lungs, spleen, stomach or intestines.

Inclusions were absent in about 25% of ferrets dying from distemper, and in the fox and mink the percentage of animals which failed to show inclusions was as high as 65. There was no evidence that tissues which did not reveal inclusions were less highly infective than tissues in which they were abundant. The presence of typical inclusions is also not absolutely pathognomonic of distemper; they were found in one of 11 normal ferrets belonging to a colony carefully protected from any contact with distemper virus, and also in two mink which died from causes other than distemper. No inclusions were found in foxes or mink which had been first immunized with distemper virus and subsequently killed at varying intervals after a later inoculation of virus.

It is suggested that the occurrence of inclusions may depend on the particular features of different strains of distemper virus and that they may be in the nature of a colloid or lipoid product arising from the interaction between the epithelial cells and the exudates with which they are in contact, rather than themselves constituting virus bodies.—E. G. White.

*Hupbauer, A., & Topolnik, E. (1942). **[An Avian Virus Disease (? Fowl Plague) in Croatia].**—*Vet. Arhiv.* **12.** 225–228. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 397]. **1418**

Description of a disease of fowls observed near Zagreb. It seems to belong to the fowl plague group.

Meyer, K. F. (1942). **The Ecology of Psittacosis and Ornithosis.**—*Medicine.* **21.** 175–206. **1419**

Psittacosis was so named because the first recognized avian host was the parrot. M. gives a table showing all the species now known to be affected; apart from the birds of the parrot family, petrels, doves, pigeons, finches, and fowls have all been incriminated as possible sources of infection for man; the wider term "ornithosis" is therefore suggested as more suitable. The virus is discharged from the cloaca and nasal mucosa of infected birds. Infection is usually acquired in the nest and recovery from this early infection often leads to a state of premunition, but bad food or hygienic conditions may cause the disease to become active again with consequent danger to the owner. The budgerigar is one of the most important sources of human infection. Wild birds are affected and the disease is present in breeding establishments in many countries.

Human case-to-case infection and aerial infection from birds is known to occur; 45 serious laboratory infections have been reported with an incubation period of 7–14 days. Human carriers may exist.

Control measures have been undertaken in most countries, and for this, laboratory diagnosis is essential. The mouse can easily be infected, but when inoculating these animals it must be remembered that the birds are often carriers of salmonella organisms. The complement-fixation test, although it does not detect all infected birds, is of great value in identifying infected aviaries.—John Francis.

Baker, J. A. (1942). **A Virus Obtained from a Pneumonia of Cats and its Possible Relation to the Cause of Atypical Pneumonia in Man.**—*Science.* **96.** 475–476. **1420**

A preliminary report of the possible relationship of a respiratory disease of cats resembling feline distemper to some of the so-called atypical pneumonias of man.—D. D. Ogilvie.

Eaton, M. D., Meikeljohn, G., VanHerick, W., & Talbot, J. C. (1942). **An Infectious Agent from Cases of Atypical Pneumonia Apparently Transmissible to Cotton Rats.**—*Science.* **96.** 518–519. **1421**

The authors state that a primary atypical pneumonia of unknown aetiology has recently been noted rather frequently in man. They succeeded in transmitting an infectious agent to two species of cotton rats (*Sigmodon hispidus hispidus* and *S. hispidus eremicus*) by intranasal inoculation in 35 out of 131 cases and caused lung lesions after the first passage; control inoculations with other similar materials were negative.

They made serial passages of the agent through cotton rats and thence to Syrian hamsters (*Cricetus auratus*), mice, rabbits, and g. pigs; only the hamsters became infected. Descriptions are given of the experimental lesions produced, and of various neutralization tests, negative bacteriological findings, and immunological studies.

Six cotton-rat-adapted strains were found to be related antigenically and during the present study two "aberrant" strains which may have been from rare cases of cotton-rat pneumonia (about 1 : 50 examined), apparently replaced the agent being passaged.

The agent passed a Berkefeld N filter in two out of six trials, but it differs from a psittacosis-like virus previously described [see Eaton *et al.*—*V. B.* **11.** 769.] and other viruses causing a disease of cotton rats by intranasal inoculation. Further studies are in progress.
—C. V. Watkins.

Neitz, W. O., Alexander, R. A., & Mason, J. H. (1941). **The Transmission of Tick-Bite Fever by the Dog Tick** *Rhipicephalus sanguineus*, **Labr.**—*Onderstepoort J. vet. Sci.* **16.** 9–17. **1422**

The strain of tick-bite fever used for the experiments had originally been isolated from a human case infected during de-ticking of dogs. For the experiments, g. pigs were infected with rickettsia from egg-membrane cultures. Elaborate precautions were undertaken to exclude the possibility of accidental tick infection. As a result of the experiment it was shown that *R. sanguineus* larvae picked up the infection when fed on reacting g. pigs, and passed it on when fed as nymphs on susceptible g. pigs. The infection could be picked up in the nymphal stage and transmitted by the adult. Furthermore, there was passage through the egg to the next generation of ticks. The criteria for positive transmission were the microscopic demonstration of rickettsia in smears from the tunica vaginalis, and the production on passage of a well defined febrile reaction with scrotal enlargement, or the development of a solid immunity in the g. pig.—E. M. Robinson.

Gear, J., & de Meillon, B. (1941). **The Hereditary Transmission of the Rickettsiae of Tick-Bite Fever through the Common Dog-Tick,** *Haemaphysalis Leachi*.—*S. Afr. med. J.* **15.** 389–392. **1423**

The experiments described were carried out in order to prove that the agent of tick typhus of man carried by *H. leachi* could pass through the egg of the tick. In one series of experiments it was shown that transmission took place through the eggs of the second generation to the third generation and it is surmised that transmission occurs for an indefinite number of generations. It was shown that all stages of the tick were infective and that nymphs were capable of trans-

mitting the infection for as long as nine months. The virus does not seem to affect the tick in any way. In tick-bite fever the intervention of a mammalian host is not necessary and the infected tick is a constant danger to man.—E. M. ROBINSON.

FINLAYSON, M. H., GROBLER, J. M., & SMITHERS, R. (1940). **Studies in South African Rickettsiosis. I. A Tick-borne Rickettsiosis isolated from** *Hyalomma aegyptium*.—*S. Afr. J. med. Sci.* **5.** 41–45. **1424**

As the vector of tick-bite fever of man in the Cape Province was not known, batches of ticks of 50–100 of various species, in all about 1,000, were examined. An infection was produced in g. pigs by one batch of *H. aegyptium*. Typical temperature and scrotal reactions were produced. An inapparent infection could be set up in white rats and mice in some cases. Agglutinins for *Proteus* strains were not produced by inoculation of rabbits. Filtration experiments were unsuccessful. As no strain of the causal agent of tick-bite fever was available for comparison, no comparative tests could be made. The disease showed the same relationship to South African typhus strains as does tick-bite fever. There may be some relationship to "Q" fever and to the Montana infection described by DAVIS & COX [*V. B.* **9.** 715].—E. M. ROBINSON.

See also absts. **1537** (influenza), **1451** (neoplastic virus).

IMMUNITY

SPRUNT, D. H., & MCDEARMAN, S. (1940). **Studies on the Relationship of Sex Hormones to Infection. IV. A Study of the Dispersion or Concentration of India Ink in Skin by Certain Sex Hormones.**—*Endocrinology.* **27.** 893–898. **1425**

In previous work [see *V. B.* **11.** 619.], it was found that there is a close correlation between the spread of India ink in the skin and the rabbit's susceptibility to infection. Experiments are now described which show that wide variation in the spread of particulate matter in the skin occurs in normal rabbits. Oestrogenic hormone and pseudopregnancy significantly reduced this spread and castration temporarily reduced it. There was some indication that the amount of spermatogenesis present in the adult male is closely related to the susceptibility of the animal to infection; the male sex hormone did not appear to affect the spread. It is suggested that the information now available indicates that certain disease agents such as vaccinia are aided by anything that causes an increased spread in the skin and others, such as moderately virulent staphylococci, are inhibited by dispersion. The converse is also true.—N. J. SCORGIE.

FEDOROVICH, M. I. (1942). Sukhie antigeny dlya reaktsii agglyutinatsii. **[Dry Antigens for the Agglutination Test].**—*Zh. Mikrobiol., Moscow.* No. 7. pp. 22–25. **1426**

F. advocates dry antigens for the aggln. test in the diagnosis of typhoid, brucellosis and tularaemia; they are especially suitable for use under field and expedition conditions and remain active much longer than liquid antigens. The preparation of dried antigens is described. —A. MOLDAWSKY.

RYKALEVA, A. M., & GOSTEV, V. S. (1942). Izvlechenie iz bakteriĭ polnovo antigena formamidom i piridinom. **[Extraction of Whole Antigen from Bacteria with Formamide and Pyridine].**—*Zh. Mikrobiol., Moscow.* No. 7. pp. 30–33. **1427**

Using Fuller's method [*V. B.* **8.** 742.], the authors obtained whole antigen by extracting dried *Vibrio cholerae* with formamide and aqueous pyridine. This antigen was precipitated by corresponding antiserum and produced antibodies when inoculated into rabbits. —A. MOLDAWSKY.

PÉREZ, J. J., GRABAR, P., & LOISELEUR, J. (1942). Propriétés immunologiques des protéides après solubilisation dans des milieux non aqueux. **[Immunological Properties of Proteins after Solution in Non-Aqueous Media].**—*Ann. Inst. Pasteur.* **68.** 430–432. **1428**

Pseudo-globulins do not appear to be modified by solution in formic acid and alcohol unless they have retained their ability to be precipitated by immune serum. At the same time, part of the antibody is not able to be precipitated by regenerated pseudo-globulins unless certain of the constituents of the latter have been destroyed or modified and unless certain groupings of all the protein molecules have been slightly altered. —J. C. BUXTON.

HAUROWITZ, F. (1942). **Separation and Determination of Multiple Antibodies.**—*J. Immunol.* **43.** 331–340. **1429**

In an investigation into the formation of multiple antibodies following the injection of a single homogeneous antigen, rabbit antisera were prepared to iodoproteins, hen ovalbumin, basic ammonium-azo-sheep-serum-globulin, and to sulphanil-, metanil-, and arsenil-azo-sheep-serum-globulin. Each of these antigens was found to induce the formation of multiple antibodies and, in two instances, the amounts of five distinct antibody fractions in the immune sera were determined quantitatively.

H. explains his experimental results by assuming that the specific groups of each of the multiple antibodies are adjusted more or less completely to particular portions of the determinant agency of the antigen, which agency he regards as a complex of several determinant factors relating particularly to the chemical groupings present and their spatial arrangement. After a brief reference to the formation of antibody globulins under the polarizing forces of antigen-determinant groups [see HAUROWITZ (1939). "Fortschritte der Allergie". Basle and New York. pp. 47], he proceeds to distinguish three kinds of antibodies. (1) "Low-grade antibodies"—their adaption to the determinant agency of the antigen is so imperfect that only reversible loose bonding occurs and no precipitate is formed directly. (2) "Imperfect undifferentiated antibodies"—their adjustment to the determinant agency of the antigen is imperfect, but sufficient to bring about precipitation by the homologous antigen. (3) "Special differentiated antibodies"—their adjustment to the determinant agency of the antigen is also imperfect, but is superior to type 2 with regard to definite determinant factors. These special antibodies are precipitated by adequate heterologous test-antigens as well as by the homologous antigen.

H. was able to demonstrate the simultaneous presence of antibodies of the second and third type in each of 12 immune sera to eight different antigens, and has some evidence that every immune serum contains antibodies of the first type.—J. LOCHIEL MCGIRR.

CRALLEY, L. J. (1942). **Factors Affecting Retention and Rate of Removal of Bacteria from the Tracheal Tree and Lungs.**—*Amer. J. Hyg.* **36.** 303–310. **1430**

Rabbits were exposed in a closed box to a fine mist of *Serratia marcescens* in which, theoretically, all the bacteria were present as droplet nuclei. The bacterial dosage was determined by a special air sampling

apparatus. After exposure, the rabbits were submitted to varying conditions of temperature (0°–38°C.) and humidity (30–80%) and were subsequently killed. The number of organisms in the trachea and lungs was determined by plating serial dilutions.

It was found that only a very small percentage of the organisms (about 4%) reached the lungs, irrespective of the dose, an indication that the filtering efficiency of the upper respiratory tract is very high. The lungs also removed the organisms at a fast rate, 80% disappearing within the first hour and 90% at the end of three hours. Extremes in temperature and humidity, within the experimental limits used, exerted a temporary depressing effect on the rate of removal.—R. E. GLOVER.

LANDSTEINER, K. (1942). **Serological Reactivity of Hydrolytic Products from Silk.**—*J. exp. Med.* **75.** 269–276. **1431**

In an approach to the, as yet, undecided question of what constitutes the smallest portion of a protein that is still capable of specifically combining with antibody, L. investigated the products of enzymatic and acid hydrolysis of silk for their ability to inhibit precipitation of the intact protein by its antiserum. [Silk was chosen as an example of a fibrous protein with a comparatively simple amino acid make-up.]

The experiments described indicated that peptide hydrolytic products, having, from amino nitrogen determinations, molecular weights of 600–1,000, were capable of inhibiting precipitation of the intact protein by its antiserum. It would, therefore, appear that silk fibroin contains determinant structures not larger than the peptides examined *i.e.* consisting of not more than 8–12 amino acids. L. considers it probable that these experiments give a fairly approximate idea of the actual size of a proteic antigenic determinant and that similar results will be obtained for other proteins. [These experiments represent an approach to the question of true antigen valence, a quantity which must necessarily be determined if accurate knowledge of the actual course of antigen-antibody reactions is to be obtained. See also following abst.—J. LOCHIEL MCGIRR.

HOOKER, S. B., & BOYD, W. C. (1942). **Specific Molecular Valence of Antigen and Antibody.**—*J. Immunol.* **45.** 127–139. **1432**

In an excellent short review the authors present and discuss evidence culled from recent papers bearing on the problem of the molecular valency of antigen and antibody. Sixty-eight references are given.

Following a definition of the term "valency" as "the number of immunochemically specific combining groups (determinants and antideterminants) present in a single molecule of antigen and antibody", the authors indicate the essentially chemical nature of the primary antigen-antibody reaction and discuss the apparent necessity for the localization of specific groups ("active patches") on the surface of the reactive molecules. They quote evidence that a polypeptide grouping of five amino acids can function to some extent as a single determinant, but observe that in native proteins a considerab greater number of amino acids must be involved in order to account for the enormous number of individual specificities.

After indicating the methods used to estimate the number of antibody molecules combined with a single molecule of antigen, they take note of the fact that the antigen valency figures so derived indicate only minimal values because one cannot be certain that maximum antigen-antibody combination has occurred, and also because there may still be valencies with which antibody cannot combine due to the steric hindrance of that already attached. [See also BOYD. *V. B.* **13.** 54.] The published figures for the following proteins are given :– crystalline ovalbumin 5; crystalline serum albumin 6; thyroglobulin 40; diphtheria toxin 8; *Busycon* haemocyanin 74; *Viviparus* haemocyanin 231. It appears that on the surface of a protein molecule of about 40,000 mol. wt., it is definitely possible to have five combining groups, *i.e.* the maximal size of a determinant seems to be an area containing not more than 30 amino acids. The authors suggest that such an "active patch" is probably represented by a rather small fraction of this number. All of the antigen valency figures so far published indicate only "minimal functional valency" but a recent paper by LANDSTEINER [see preceding abst.] is quoted which appears to approach the question of true antigen valency.

There is no direct evidence that the reactivity of antibodies is, similarly to that of antigens, localized in certain areas of their surface, but the authors suggest that the reactive part of the antibody (antideterminant) is also a restricted area, and that it is roughly the same size as an antigenic determinant. Stereochemical considerations indicate that this antideterminant area may be present as a superficial depression which more or less accurately fits the "embossed" determinant-templet. [See also HOOKER and BOYD.—*V. B.* **12.** 591 and PAULING.—*V. B.* **12.** 30]. The question of the univalence, divalence, or multivalence of antibodies is then discussed, the authors being protagonists of the univalence theory and pointing out the difficulties in the way of other theories of antibody formation and structure. [See also PAULING.—*V. B.* **12.** 30 and HOOKER.—*V. B.* **8.** 451]. They quote figures for antibody valency based on the analysis of precipitates as follows :– anti-ovalbumin 1; anti-serumalbumin 1; antithyroglobulin 1; diphtheria antitoxin 1 or 2; anti-*Viviparus* haemocyanin 1; they suggest that the large molecules (mol. wt. *ca* 1×10^6) which appear to constitute some equine anti-carbohydrates may be an exceptional class which, if polymers, could plausibly be multivalent. It is suggested that the evidence obtained from antigen-antibody reactions between layers absorbed on built-up stearate films [see PORTER & PAPPENHEIMER.—*V. B.* **10.** 433.] need not necessarily indicate antibody divalence, since the antibody molecules may be arranged in an alternate "head-tail" fashion.

The arguments in favour of the "alternation" hypothesis, and the evidence against it are also discussed [see also PAULING.—*V. B.* **12.** 30; HOOKER & BOYD—*V. B.* **12.** 591; BOYD—*V. B.* **13.** 54; HAUROWITZ & SCHWEIN—*V. B.* **13.** 92.]—J. LOCHIEL MCGIRR.

See also absts. **1441** (cestode immunity) **1572** (parasite immunity).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SIMMON S. W., & DOVE, W. E. (1942). **Waste Celery as a Breeding Medium for the Stablefly or "Dog Fly", with Suggestions for Control.**—*J. econ. Ent.* **35.** 709–715. **1433**

Waste celery is reported to be an important breeding place for *Stomoxys calcitrans* and *Musca domestica* in Florida. From 1 cu. ft. of waste celery as many as 50,000 adult *S. calcitrans* emerged in 14 days, and from another sample over 300,000 *M. domestica* emerged in 11 days. In the vicinity of waste celery dumps, cattle suffered severely from fly attack and some owners of dairy cattle reported reductions of approximately 25% in milk yield.

For control, it is recommended that all waste celery

should be pulped and sprayed with diluted creosote. —W. MOORE.

LEWIS, E. A. (1942). **Tsetse-Flies and Development in Kenya Colony. Part III.**—*E. Afr. agric. J.* **8.** 74–79. [For part II, see *V. B.* **13.** 94]. **1434**

This part deals with methods of tsetse control, and points out that traps, which have been so successful against *Glossina pallidipes* in Zululand, soon deteriorate under tropical conditions, do not attract *G. pallidipes* when the density is low, and seem to be less attractive at some seasons than at others. Local experience in Kenya shows that the creation of an artificial fly concentration by the use of scent baits, etc., is necessary to prolong or increase the efficacy of the traps.

Ruthless bush clearing as a means of controlling tsetse has come to be considered too drastic and costly, but it has been shown that the clearing of barriers is sufficient to prevent extension, and can be used to isolate blocks of infested country in which the tsetse can be dealt with by other methods. Discriminative clearing and densification of bush can be used in some areas to render them unsuitable for tsetse, but the degree of afforestation required by each species has not yet been determined, and often two or more species are concerned in one area.

Game reduction appears to have given very satisfactory results in Southern Rhodesia, but it is doubted whether it would be effective against species which are not so well adapted to game as is *G. morsitans*. Each species and each area present different problems in control. It is suggested that a plan of approach should be adopted which should be sufficiently flexible to allow for modifications and new methods, as research workers discover new means of attack.—U. F. RICHARDSON.

HAFEZ, M. (1941). **Investigations into the Problem of Fly Control in Egypt.**—*Bull. Soc. Fouad 1er Ent.* **25.** 99–144. **1435**

A general account of fly control measures. —J. B. CRAGG.

STEINHAUS, E. A. (1942). **The Microbial Flora of the Rocky Mountain Wood Tick, Dermacentor andersoni Stiles.**—*J. Bact.* **44.** 397–404. **1436**

Among a large variety of bacteria isolated from 2,016 unfed adult ticks and 486 ticks which had recently had a blood meal, some being from a laboratory strain whilst others were collected in the field either from vegetation or from natural hosts, four strains of *Pasteurella tularensis* were found, this being the first record of the isolation of these organisms from *D. andersoni* by cultural methods.

It is concluded that the flora of *D. andersoni*, unlike that of some insects, is a purely fortuitous one acquired whilst feeding.—J. B. CRAGG.

WINER, L. H., & STRAKOSCH, E. A. (1941). **Tick Bites —Dermacentor variabilis (Say).**—*J. invest. Dermatol.* **4.** 249–258. **1437**

Careful and well illustrated descriptions are given of the histology of *D. variabilis* bites in human beings. —J. B. CRAGG.

See also absts. **1422-1424** (vectors of rickettsia), **1448** (of filariae), **1452** (of fibroma virus), **1508** (poisoning by meal mites), **1569** (parasite immunity), **1527-1534** (insecticides).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

GALLIARD, H., & DANG VAN NGU. (1941). Une nouvelle espèce d'*Eurytrema*, *E. tonkinense* n. sp. parasite du pancréas des bovidés. [*Eurytrema tonkinense* **n. sp., Parasitic in the Pancreas of Cattle**]. —*Ann. Parasit. hum. comp.* **18.** 187–191. **1438**

E. tonkinense is easily distinguished from *E. pancreaticum* since it is darker in colour and at least 14 mm. long, whereas *E. pancreaticum* never exceeds 12 mm. in length.—E. R. PARISER.

*VINK, H. H. (1941). Massale infectie met vrij in de buikholte aanwezige Cysticerci tenuicollis bij een varken. [**Mass Invasion of the Peritoneal Cavity by** *Cysticercus tenuicollis* **in a Pig**].—*Tijdschr. Diergeneesk.* **68.** 142–144. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 208]. **1439**

Several thousand *C. tenuicollis* cysts were found free in the peritoneal cavity of a pig carcass weighing 78 kg. Numbers were present in the mesentery and also under the peritoneum. Numerous lesions, the size of a match head, were present in the liver, but there was no evidence of migration. The author postulates a route of migration other than by the portal vein and the liver, and suggests that the lymphatic system may be implicated.—H. D. CROFTON.

CLAPHAM, P. A. (1942). **On Identifying** *Multiceps spp.* **by Measurement of the Large Hook.**—*J. Helminth.* **20.** 31–40. **1440**

The chitinous large hook of *Multiceps*, being a more constant feature than many of the morphological characters generally used in specific diagnosis, is used by C. for specific diagnosis within the genus *Multiceps*. The dorsal and ventral blade lengths of the large hooks of *Multiceps* cysts are analysed statistically and comparisons are made with the measurements recorded by other authors. By this method the number of species in the genus is reduced to six, *M. multiceps* being considered to be a species of wide host and geographical distribution and to include *M. serialis*. Of the remaining five valid species, *M. gaigeri* may require further consideration.—T. E. GIBSON.

LARSH, J. E., Jr. (1942). **Transmission from Mother to Offspring of Immunity against the Mouse Cestode,** *Hymenolepis nana* **var.** *fraterna*.—*Amer. J. Hyg.* **36.** 187–194. **1441**

It was shown that mice born of mothers infested with this cestode exhibit a marked degree of resistance to infection, this passive immunity persisting for about 37–41 days after birth. Protective substances are also transmitted to young born of previously infested but worm-free mothers. Transmission of protective substance takes place both *in utero* and by the milk, but the latter route was found to afford better protection and for a longer period after birth.—M. L. BINGHAM.

BRANDT, F. A. (1941). **The Differential Staining of the Hooklets of Tapeworms.**—*S. Afr. med. J.* **15.** 277–278. **1442**

Permanent preparations of the hooklets of tapeworms suffer from the disadvantage that the hooklets do not stain by the usual methods. B. stains sections with hot, concentrated alcoholic fuchsin (basic) by burning the alcohol but not allowing drying on the slide and follows this by treatment with 95% alcohol for 30 sec. and decolorization with 2% sulphuric acid. The decolorization is controlled by microscopic examination. Counterstaining is done with 1% methylene blue. The hooklets stain red on a blue background. Another method also described is a modified Gram staining and gives good results.—E. M. ROBINSON.

LIEBNITZ, W. (1942). Sind die Pferdestrongyliden die Ursache der Mangelkrankheit der Pferde und Fohlen, oder ist verstärkter Strongylidenbefall eine Begleiterscheinung oder gar Folge vorliegender Mangel-

krankheit? **[Is Strongyle Infestation the Cause or the Result of Deficiency Disease in Horses and Foals?]** —*Tierärztl. Rdsch.* **48.** 279–282 and 298–301. **1443**

Horses in poor condition in East Prussia were commonly found to be affected with strongyle infestation and concurrent deficiency of minerals (particularly Ca and P). Over 3,600 of these cases have been treated successfully with intravenous injections of "kachexid" (a mineral preparation plus hormones) and intramuscular infections of "vigantol" (containing vitamin D). Twelve detailed case histories are given. It is concluded that mineral deficiency is the primary condition, and that it favours the development of strongylosis.—D. G. Gilmour.

Porter, D. A. (1942). **Incidence of Gastrointestinal Nematodes of Cattle in the Southeastern United States.** —*Amer. J. vet. Res.* **3.** 304–307. **1444**

P. gives the results of partial or complete examinations for helminths of the abomasum, small intestine, and large intestine of 84 cattle, ranging from 1–18 months of age, from Alabama, Georgia, Florida, Mississippi, and Louisiana. In some animals only the stomach, in others only the intestine, was examined; the total number of each species of the smaller nematodes was estimated from samples, while the larger worms were counted after screening the intestinal contents. P. notes that because the animals examined were from a variety of sources, the numbers in any individual age or breed group or from any one farm were too small for critical analysis of the effects of any factors on the worm burdens. The range in the number of parasites and the percentage of animals parasitized were:– *Haemonchus contortus* (including *H. similis*) 6–10,500, *H. contortus* 83%, *H. similis* 18%; *Ostertagia ostertagi*, 5–4,000, 74%; *Trichostrongylus axei*, 2–28,000, 47%; *T. colubriformis*, 100–9,700, 9%; *Cooperia punctata*, 2–129,360, 91%; *C. pectinata*, 4–27,668, 32%; *C. oncophora*, 19–258, 11%; *Bunostomum phlebotomum*, 1–2,216, 62%; *Strongyloides papillosus*, 6–2,600, 21%; *Nematodirus helvetianus*, 2–4,500, 15%; *Capillaria longipes*, 20–400, 7%; *Oesophagostomum radiatum*, 1–6,256, 59%; *Trichuris* spp., including *T. ovis* and *T. discolor*, 1–372, 44%. Tapeworms (*Moniezia* sp.) were also found in 14 of 81 animals in which the small intestine was examined. P. notes that this appears to be the first report of *T. discolor* and *N. helvetianus* in southeastern U.S.A.—J. N. Oldham.

Shorb, D. A. (1942). **Survival of Sheep Nematodes in Pastures.**—*J. agric. Res.* **65.** 329–337. **1445**

S. reviews the literature on the survival of nematodes on pastures. Lambs free from infestation were grazed on Maryland pastures contaminated by infested ewes. P.M. examinations were made in one experiment to determine the number and species of parasites picked up by the lambs. In later experiments estimations were based on differential egg counts.

The larvae of species of *Bunostomum*, *Capillaria*, *Chabertia*, *Cooperia*, *Haemonchus*, *Nematodirus*, *Oesophagostomum*, *Ostertagia*, and *Trichostrongylus* disappeared in about two months during summer. Shade and a heavy growth of grass did not seem to give protection to the larvae. In winter, development to the infective stage did not occur, but some eggs of *Ostertagia* and *Trichostrongylus* survived and reached the infective stage in the spring.—H. D. Crofton.

Dinaburg, A. G. (1942). **The Efficiency of the Baermann Apparatus in the Recovery of Larvae of** *Haemonchus contortus*.—*J. Parasit.* **28.** 433–440. **1446**

The experiments described were designed to test the efficacy of the Baermann apparatus for the recovery of *H. contortus*. Samples of "clean" soil and sheep faeces were contaminated with known numbers of larvae and comparable tests were made of the numbers of larvae which passed through these samples in unit time when they were placed in metal screens covered with a layer of heavy muslin cloth, and also of the number which passed through muslin alone. The efficiency was found to vary with the type of substrate and the number of larvae originally present. When the initial number of larvae was less than 600, averages of 24, 11, and 5% passed through cloth alone, soil, and faeces respectively, whilst for numbers of larvae over 600 the corresponding percentages were 74, 33, and 11. With numbers of larvae over 600 the variations in percentage recovery from cloth alone or soil were due to variable working of the apparatus rather than to variations in the technique of handling the larvae.—T. E. Gibson.

Goble, F. C., & Cook, A. H. (1942). **Notes on Nematodes from the Lungs and Frontal Sinuses of New York Fur-Bearers.**—*J. Parasit.* **28.** 451–455. **1447**

The results are recorded of a survey of the parasites from the lungs and frontal sinuses of fur-bearing animals trapped during three years in New York State. A table is given showing the identity and incidence of the parasites discovered in each of the host species examined. Brief reference is made to the pathology of some of the cases examined.—T. E. Gibson.

Galliard, H. (1941). Recherches sur le mécanisme de la transmission des filaires par les culicidés. **[Mechanism of Transmission of Filariae by Mosquitoes].**—*Ann. Parasit. hum. comp.* **18.** 209–214. **1448**

G. briefly reviews the experiments which have been carried out on the subject and then describes his own investigations on various filariae, including *Dirofilaria immitis*. He thinks that the flexion of the labium when the mosquito takes in food, is the main cause of exit of the larvae. Larvae have been observed, however, to leave the insect as rapidly when it fed on sugar solution as when it fed on blood. Larvae remain alive only for a few days after the normal completion of their development at a given temperature, if the temperature is maintained. If the temperature is considerably lowered, the mature larvae seem to remain indefinitely alive. Massive infestation of the labium may cause its rupture, but infected insects seem generally to survive as long as non-infected insects.—E. R. Pariser.

See also absts. **1535**, **1536** (phenothiazine), **1569** (parasite immunity).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Bloom, F. (1942). **Spontaneous Solitary and Multiple Mast Cell Tumors ("Mastocytoma") in Dogs.**— *Arch. Path.* **33.** 661–676. **1449**

In five dogs of 5–15 years, solitary (in three) and multiple neoplasms consisting of atypical mast cells were found in the skin and in one case also in viscera. All were non-encapsulate, diffuse or nodular collections of cells, those in the skin being subepithelial and non-adherent to the subjacent connective tissue.

The majority of the tumour cells were round, oval, or polyhedral with fairly abundant cytoplasm containing numerous metachromatic basophile granules and

nclusion bodies of four possible types, *viz*, rod-shaped bodies, crystalloids, spherical homogeneous or granular basophile bodies, and spherical acidophile bodies. They appeared to be derived from pre-existing tissue mast cells by mitosis and amitosis.

The multiple tumours in the skin and viscera were thought to be of multi-centric origin; the malignancy of such cases is debatable.

Mastocytomas, the name proposed, have not before been described in dogs.—J. W. WHITTICK.

GREAT BRITAIN. (1942). **British Empire Cancer Campaign. Nineteenth Annual Report 1942.** [Edited by LOCKHART-MUMMERY, J. P.] pp. 86. London: British Empire Cancer Campaign. [4to]. **1450**

In spite of difficulties due to reduction of staff the Campaign was able during 1942 to continue to support all the research centres to which grants were previously made. A summary of the work carried out by the various institutions and individuals receiving grants occupies 70 pages of the report. It is not possible to do more than indicate a few of the main headings, *viz*, experimental carcinogenesis, the biochemistry of tumours, viruses, genetics, general pathology, clinical studies of oesophageal carcinoma in man, the effects of radiation on a wide variety of biological material including plant and animal viruses, bacteria, tissue cultures, induced and spontaneous tumours in animals, and human malignant growths. Much of the work described in the report has already been published and there are over 100 references.—E. G. WHITE.

KIDD, J. G. (1942). **'The Enduring Partnership of a Neoplastic Virus and Carcinoma Cells. Continued Increase of Virus in the V2 Carcinoma during Propagation in Virus-Immune Hosts.**—*J. exp. Med.* **75.** 7–20. **1451**

Extraneous, parasitic viruses such as vaccinia, virus III and yellow fever virus, can ride as passengers in transplanted tumours, but they sometimes disappear from them spontaneously, and have also been eliminated by transplanting the growths to hosts immune to the virus.

This paper records the persistence and usual multiplication in a transplanted rabbit carcinoma (V2) of the virus primarily responsible for it, despite propagation through five successive groups of rabbits hyperimmunized against the virus.

Such enduring partnership of a neoplastic virus with carcinoma cells is in contrast, therefore, with the casual association of passenger virus with tumour cells. —J. W. WHITTICK.

PHILIP, C. B. (1942). **Mechanical Transmission of Rabbit Fibroma (Shope) by Certain Haematophagous Bugs.**—*J. Parasit.* **28.** 395–398. **1452**

Working on the principle that infection with fibroma virus immunizes against the invariably fatal myxoma virus in the domestic rabbit, P. demonstrated that mechanical transmission of fibroma by triatomid bugs was at least a possibility. Nymphal and adult triatomids were allowed to feed directly on an active fibroma, and then on two test rabbits. Two other rabbits were injected with the visceral contents of infected bugs. All four rabbits survived immunity challenge tests with myxoma virus, indicating successful transmission of the fibroma.

Bugs fed on infective lesions lost their ability to transmit fibroma by feeding, after storage for 12 days. Attempted transmission by injection of visceral contents, after 71 days' storage, was also negative. P. considers that mechanical transfer was by the contaminated mouthparts, rather than by regurgitation.—I. W. BURTON.

POLLARD, M., & HALL, W. J. (1942). **Interspecies Transmission of Avian Leucosis in Embryos.**—*Amer. J. vet. Res.* **3.** 247–252. **1453**

The transmission of avian leucosis to 10–16-day-old embryos was accomplished by the intravenous inoculation of the blood of leucaemic chicks or chick embryos.

Blood changes were induced in turkey, duck, guinea fowl, pheasant, and quail embryos with inocula from chick embryos. The liver, spleen and kidneys of infected embryos were enlarged and red.

The blood of leucaemic turkey embryos was infective to duck, turkey, guinea fowl, pheasant, and quail embryos, whilst leucaemic blood from guinea fowl embryos was infective to turkey, guinea fowl, and pheasant embryos.

The results indicate that a wide range of avian embryos is susceptible to the leucosis agent.—F. D. A.

LÜBKE, A. (1942). Einiges über die Rinderleukose. Zugleich ein Beitrag zu ihrer Pathologie. **[Notes on Bovine Leucosis].**—*Tierärztl. Rdsch.* **48.** 313–315 and 329–334. **1454**

A general account of leucosis in cattle, consisting mainly of material which L. has previously published [see *V. B.* **11.** 241, and **12.** 107]. The course of the disease can be divided into three stages:—(1) a pre-leucotic stage in which the animal is considered to be in a state of susceptibility (it is not certain whether susceptibility is inherited); (2) a pre-clinical stage in which diagnosis can often be made by histological examination of an excised lymph node, and (3) a clinical stage.

Clinical symptoms depend on the distribution of the leucotic changes and L. gives a detailed account of the lesions in the various organs and tissues. In difficult cases diagnosis can often be confirmed by histological examination of a superficial lymph node and this biopsy technique can with advantage be supplemented by a study of the blood picture. There is no information as to how the disease can be prevented or cured and the only useful measures for its control consist of diagnosis at the earliest possible moment and slaughter of affected animals whilst they are still in good bodily condition. —E. G. WHITE.

See also abst. **1574** (carcinogenic compounds).

DISEASES, GENERAL

STECK, W. (1942). Zur Feststellung und Bekämpfung der heute verbreiteten Seuchen des Dienstpferdes. **[The Recognition and Control of Present Day Infectious Diseases of Army Horses].**—*Schweiz. Arch. Tierheilk.* **84.** 1–13. **1455**

In a lecture to veterinarians, S. reviews the more important diseases of army horses under the headings of periodic and aperiodic diseases, the former being those which occur in epizootics at intervals and the latter those which occur at any time.

Among the periodic diseases equine influenza ("pink eye") broke out in Switzerland in 1938–39, during which it was observed in very mild form in a few horse surgical patients, a reminder of the great value of complete rest in the prevention and treatment of this disease. Contagious pneumonia has not occurred in Switzerland for many years. S. emphasizes the value of neosalvarsan in the early stage. Equine infectious bronchitis [called *skalma* in Switzerland] is not stated to have occurred there recently. It is important to

allow rest in the earliest (pure virus infection) stage and sulphanilamide is indicated before the broncho-pneumonia stage is severe.

Aperiodic diseases include strangles and equine infectious anaemia. Rest plus sulphanilamide are indicated in strangles. The difficulty of diagnosing E.I.A. is discussed and some typical temperature charts are shown.—J. E.

*WILLEMS, A. E. R. (1940). **[Contagious Pneumonia in the Horse].**—*Vlaam. Diergeneesk. Tijdschr.* **9.** 213–228. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 317]. **1456**

W. reports the results of five years' observations in the course of which over 1,000 cases were seen. It was impossible to isolate any organism from the blood of affected horses and the disease could not be transmitted by contact nor by the subcutaneous, intravenous, or intratracheal injection of blood, or of pleural or pulmonary exudate. Filtered lung fluid from an early case was non-infective. Thus no advance in the aetiological problem was made.

In Holland the incubation period averaged 70–80 days and the disease often appeared after the cessation of an outbreak of strangles in recovered horses. Mortality in the well cared for horses was only 2%.

LAWRENCE, D. A. (1942). **Sweating Sickness.**—*Rhod. agric. J.* **39.** 236–240. **1457**

This is a general article on "sweating sickness", a specific disease of calves which affects mainly those between the age of a few weeks and six months. The incidence is seasonal, cases occurring during the hot rainy season of January-March. Symptoms develop rapidly. There is profuse sweating over parts of the body, especially the neck, flank, face, groin, shoulder, and base of the ears, with a high temperature and hyperaesthesia of the skin. Affected animals are dull, and salivation and lachrymation are profuse. The oral mucous membrane is reddened. With the progress of the disease, the temperature subsides and hair falls out leaving raw, red patches of skin. The course is rapid, death occurring in fatal cases within 2–5 days, but morbidity and mortality vary considerably. Recovery is slow and recovered animals remain unthrifty for months.

There are no gross lesions apart from those associated with the symptoms, but characteristic microscopic lesions are present in the kidneys.

Good results are claimed for treatment with liver preparations. Intravenous injection of 10·0 ml. of a 25% solution of formalin is also claimed to give good results.

L. attempts to evaluate the evidence concerned with the nature of the disease. He inclines to the view that it is essentially a metabolic disorder.

The suggestion is made that by calving in April, May and June, the incidence may be reduced.

—M. H. KYAW.

*WEHR, H. (1941). Ueber gehäufte Erkrankungen und Todesfälle an multipler Herzmuskelnekrose und hühnerfleischähnlicher Muskeldegeneration in einer grossen Schweinemästerei Hannovers im Zeitraum eines Jahres. **[Disease and Deaths in Swine due to Heart Necrosis and Fowl-Flesh-Like Muscular Degeneration].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 189]. **1458**

During one year, 15% of a herd died after sudden, brief illness; in 4% of them there was myocardial necrosis and in 1% myocardial and skeletal muscle degeneration. Most of the cases occurred in April and May when the pigs reached a weight of 50–55 kg. A specific causal agent was suspected, but not found.

*BÖTTCHER, H. (1941). Die Schnüffelkrankheit, ihre Ursachen und Verhütung. **[Chronic Deforming Rhinitis of Pigs; its Cause and Prevention].**—*Z. Schweinez.* pp. 251–253. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 149]. **1459**

The causation of this disease is not properly understood. It is assumed to be due partly to faulty nutrition and partly to genetical factors. B. considers that pigs with a history of relationship to this disease should not be used for breeding, and advises that when it occurs, attention should be given to the hygienic conditions, particularly the nutritive quality of the food and the prevention of infections related to dirty conditions.

—M. LANDAU.

BUNYEA, H., & WEHR, E. E. (1941). **Diseases and Parasites of Poultry.**—*Fmrs' Bull. U.S. Dep. Agric.* No. 1652. pp. 82. [Revised Edit.] **1460**

The purpose of this bulletin is to inform poultry owners about the characteristics of the various diseases and infestations in order that the most intelligent use can be made of the approved methods of control of poultry diseases. Although all the common and many of the rarer diseases of poultry are dealt with in rather greater detail than is usual in this type of publication, the simple language, clear concise explanations, and many excellent illustrations, make it not only an extremely valuable and instructive bulletin for the poultry farmer, but also a useful reference for the veterinarian interested in poultry work in the field.

—R. F. GORDON.

FOURIE, J. M., & SNYMAN, P. S. (1942). **"Blouwildebeesoog".**—*J. S. Afr. vet. med. Ass.* **13.** 43–47. **1461**

"Blouwildebeesoog", literally "blue wildebeest eye", is a disease of cattle, sheep, goats, and horses occurring along the Kuruman and Molopo rivers in Bechuanaland when these animals come in contact with the blue wildebeest (*Connochactus taruinus*). The disease is characterized by an exophthalmia with blindness in one or both eyes. In certain breeds of sheep nervous symptoms are seen. Epizootics of the disease occur in dry seasons when thousands of wildebeest migrate southwards from Bechuanaland into the Union of South Africa. There is a definite association of the severity of the disease with the concentration of wildebeest in the area. The wildebeest do not show any symptoms and must be regarded as carriers of the condition. In a flock of 755 pure and cross-bred Karakul sheep examined by the authors there were 110 affected animals, and there had been 50 deaths. About 25% of the cattle were affected. The majority of the animals were affected in only one eye. Merino sheep and goats are resistant to the disease, but cattle are very susceptible, although they only develop a mild form and recover.

Two forms are seen (a) with ophthalmic lesions only, and (b) with nervous symptoms in addition. In (a) one or both eyes may be infected. First there is protrusion of the eyeball. Later the cornea develops a haziness and may turn blue or white. Rupture of the eyeball often occurs from internal pressure. Recovery may occur without any traces of the lesions remaining. In (b) the nervous symptoms are seen only in very susceptible sheep such as the Karakul and Afrikander. They may occur before or after the eye lesions. The animals move round in circles in the opposite direction to the affected eye. Symptoms of ataxia are seen and the legs are picked up very high when walking. Affected animals are not able to eat or drink successfully. This form is always fatal. P.M. the only lesions were seen in the eyes and consisted of oedema and cellular infiltration of the cornea sometimes with iridocyclitis.

—E. M. ROBINSON.

*SCHNEIDER, B. (1941). Ueber Hyperkeratosen der Papillen an der Hauben-Psalteröffnung des Rindes. **[Hyperkeratosis of the Papillae at the Rumeno-Reticular Junction in Cattle].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 190]. **1462**

In 96% of the cattle, but in no sheep or goats examined, S. found that the papillae in question were hyperplastic, having a very strong cornified epithelium impregnated with calcium carbonate and with chlorophyll. This condition had no relationship to breed, sex, or age and arises from normal stimuli of coarse fodder.

*TAKÁCS, L. (1941). **[Changes in the Fundus Oculi in Cattle].**—*Inaug. Diss., Budapest.* pp. 28. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 244]. **1463**

The eyes of over 400 bovines were examined. The colour tinge of the fundus oculi appeared to vary with the colour and breed of the individual animal. Pathological changes of the fundus were observed in 10·2% of cases. These included coloboma of the tapetum lucidum, detachment of the retina, haemorrhages and acute and chronic inflammations of the papilla and optic nerve.—M. LANDAU.

*GÖTZE, R. (1941–42). Untersuchungen, Erfahrungen und Gedanken zur Retentio secundinarum des Rindes. **[Research and Experience on Retention of the Placenta in Cattle].**—*Dtsch. tierärztl. Wschr.* **49.** 598–601, and **50.** 4–8. **1464**

As bacterial infection of retained foetal membranes takes place about 12 hours after parturition, any retention over this period must be considered pathological. The aetiology and anatomical changes are discussed. The inflammatory changes which lead to retention are present in most cases weeks or months before calving: 30% of all cases of retention in Germany are due to *Brucella abortus* infection, but other organisms entering the bloodstream from suppurating wounds, cases of mastitis, pleurisy, peritonitis etc. may settle in the placenta and lead to placentitis. Non-infectious causes of retention are less common, but include allergic conditions, mineral and vitamin deficiencies, poisons and drugs, notably heavy metals and vermicides, rough handling during calving, or twists and displacements of long duration leading to congestion.

Spontaneous separation and expulsion will occur in 3–10 days with a variable degree of endometritis and systemic disturbance if no treatment is undertaken. Of all cases of retained placenta seen at the Hanover clinic, 3–4% resulted in death or emergency slaughter, 20% in long illness and infertility, 50–60% in short illness and temporary reduction in milk yield and fertility, and 15–25% showed no ill effects.

At the Hanover clinic the membranes are removed manually as soon as this is possible without injury, under epidural anaesthesia. This is followed by the injection into the depths of the uterus of 100 g. marfanil-prontalbin, a sulphanilamide preparation, in 250 ml. water. This drug has been shown to be superior to prontosil rubrum for this purpose. It is very slowly soluble and therefore prolonged bactericidal action is obtained, but *Corynebacterium pyogenes* is not affected. Marfanil-prontalbin is too scarce and costly for general use at present, but it is hoped that an improved and cheaper preparation will be developed soon.

—ANN F. RUSSELL.

*SUNDBERG, R. (1941). **[Urethral Colic in Newborn Male Foals].**—*Svensk VetTidskr.* **46.** 199. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 189]. **1465**

Two case records of urethral obstruction.

*SPELLMANN, F. (1941). Systematische Untersuchungen über die pathologisch-anatomischen Veränderungen der Nebenniere des Rindes. **[Pathology of the Adrenal Glands in Cattle].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 190]. **1466**

S. examined the adrenals of 6,248 cattle and found melanosis in 14, amyloidosis in 4, tumours in 10, lymphadenosis in 2, TB. in 6, and various inflammatory conditions in 8, animals. The abstract gives some particulars of these cases.

MAGNUSHEVSKIĬ, L. K. (1940). Enzooticheskaya lomkost' kostei krupnovo i melkovo rogatovo skota v raione urovskoi endemiĭ. **[Enzootic Fragility of the Bones of Cattle in the Urov Region].**—*Arkh. biol. Nauk.* **60.** No. 2. 16–20. **1467**

In the course of three years, M. registered 258 cases of spontaneous fractures in cattle in 42 out of 50 villages in the Urov region where investigations were made. In one village, 19% of the cattle were affected. In most cases the fractures were observed in the ribs, either there alone or together with fractures of the limbs. The scapula was affected in 146 cases (in 17 cases bilaterally), the femur in 15, the humerus in 6 and the pelvis in 2. In four cases fractures developed almost simultaneously in all four extremities. The fractures usually appeared when the animals were two years old. In the case of sheep, however, the condition was observed from the age of two months, and in calves from the age of four months. It is stated that recovery was in most cases rapid: after 10–15 days the animal again began to use its fractured limb and after a month traces of lameness had completely disappeared.

M. describes the pathological and anatomical material which he was able to collect from 37 animals. Differential diagnoses were made from 54 X-ray pictures. [Owing to the very small size of the cattle concerned, judging from the photographs shown, this use of X-ray diagnosis was possible: it is doubtful whether it could have been used on large animals.] Histological observations were also carried out. The histological picture obtained eliminates osteoporosis as the cause and does not support the theory of Ca deficiency; also the fact that fractures were observed in cattle on limestone areas seems to rule out the possibility that Ca deficiency plays a decisive role in the aetiology of the disease.—E. R. PARISER.

BENOIT, R. (1942). De la gangrène symmétrique du lapin. **[Symmetrical Gangrene in Rabbits].**—*Schweiz. Arch. Tierheilk.* **84.** 144–149. [In French]. **1468**

B. describes symmetrical dry gangrene, with loss of the extremities at various levels affecting all of a litter of six young rabbits. Two rabbits had gangrene of the external genitals without venereal infection. Apart from slight parasitic disease in one rabbit, no lesions in any organ except the spinal cord were noted and here gross degeneration of the ganglion cells of the grey matter, principally of the anterior and posterior horns, occurred probably throughout the whole of its length, according to the numerous serial sections examined. B. suggests that the cause was solely nervous and that prolonged and repeated spasm of the vessels was produced. No evidence of specific infection was found.—C. V. WATKINS.

WEIDLICH, N. (1942). Beitrag zur Amyloidose der Rotlaufserumtiere. **[Amyloidosis of Swine Erysipelas Antiserum Producers].**—*Z. InfektKr. Haustiere.* **58.** 278–305. **1469**

W. describes in detail the development of amyloidosis in the organs of 70 horses and ten mules used for

the production of S.E. antiserum. Most of the animals were given weekly subcutaneous injections of 48-hour cultures of *Erysipelothrix rhusiopathiae*, the dose increasing from 25 ml. to 300–500 ml. In a few animals the injections were made intravenously. Most of the animals were eventually slaughtered because of endocarditis (9), arthritis (8), or liver rupture (49).

Iodine and sulphuric acid was found more satisfactory for demonstrating amyloid deposition than either methyl violet or congo red. In addition to the typical brown colour given by iodine, L. frequently observed amyloid which stained greenish or bluish, *i.e.* the result usually obtained only after subsequent treatment with sulphuric acid. The iodine test gave positive results with material fixed in formalin for as long as 30 months.

The incidence of amyloidosis was :– spleen 96%, liver 86%, kidney 22%. In the spleen the amyloid was deposited in the follicles, pulp, and trabeculae, the first being the commonest site. The earliest evidence of amyloidosis of the spleen was seen in animals receiving a total of 1·57–4·22 litres of culture. In the liver, amyloid was usually first deposited in the peripheral part of the lobules and with increasing severity extended towards the central lobular veins. In severe liver amyloidosis the hepatic veins showed amyloid deposits, whereas the hepatic artery and portal vein were unaffected.

Inoculation of about 13 litres of culture was required to produce liver lesions and severe changes were present in horses receiving 20 litres. In the animals which developed liver rupture there was multiple intralobular focal necrosis. In the kidney amyloid was laid down in the interstitial tissue (8 animals), glomeruli (5), basal membrane of the tubules (3), and in the walls of arteries (2), some of the animals showing deposits in more than one situation. Inoculation of about 22 litres of culture was required to produce renal amyloidosis and the only example of severe involvement of the glomeruli was in a horse given 120 litres over a period of 85 months.

Allowing for individual variations, the severity of amyloidosis was proportional to the number of inoculations. Proliferation of reticulo-endothelial cells in the liver and spleen and cellular infiltration of the interstitial tissue of the liver and kidney were common findings and appeared to represent a reaction to the repeated parenteral inoculations.—E. G. White.

Monge, C. (1942). **Life in the Andes and Chronic Mountain Sickness.**—*Science.* **95.** 79–84. **1470**

The high (10,000–16,000 feet) plateaux of the Andes have been inhabited since prehistoric times, and at present some 12,000,000 people and a variety of domestic animals are living on them. The oxygen pressure is about 85 mm. as opposed to 150 mm. at sea level, and there appear to be pronounced differences between acclimatized and non-acclimatized individuals. Most of the data and discussion in M.'s review deal with the human subject, and the only statements of direct veterinary interest are those dealing with reproduction. Rams which have been acclimatized since colonial times are 100% fertile, whereas only about 50% of those brought from sea level are fertile during the first year, and the highest reproductive average reached after 2–3 years is 70%. Sterility is also found in imported rabbits, cats, horses, and cattle, the pathological picture resembling that of cryptorchidism ; also, eggs brought up from sea level do not always hatch.—A. N. Worden.

Cole, R. K. (1942). **The "Talpid Lethal" in the Domestic Fowl.**—*J. Hered.* **33.** 83–86. **1471**

A lethal character, which C. describes as "talpid" (L. *talpa*, a mole), was recognized in 1931 in White Leghorn chicks. The embryos were structurally abnormal, particularly in their appendages and typically exhibited reduction in the length of the proximal limb bones, duplication of the distal limb bones, shortening of the entire vertebral column, extreme ectopia (more marked in older embryos), subcutaneous oedema, retarded development of the face and inferior maxilla, and reduction in the number of feather papillae. The eyes, external ear and comb appeared to be normal. Affected embryos died usually about the 8th–10th day of incubation, but in certain hybrid matings death did not occur until the 17th day. Parents which were heterozygous for the character appeared structurally normal.

Genetic studies indicate that the talpid lethal is inherited as a simple autosomal recessive character, for which C. suggests the genetic symbol *ta*.—A. N. W.

Landauer, W. (1941). **A Semi-Lethal Mutation in Fowl Affecting Length of the Upper Beak and of the Long Bones.**—*Genetics.* **26.** 426–439. **1472**

In 1938, from matings of polydactylous fowls, newly hatched chicks were found which had abnormally short upper beaks. In many of them the beak became normal during growth, but in others a cross beak developed. It was observed that some of the embryos and chicks with short upper beaks also had short legs and investigation showed that the mean length of all long bones in these instances, as compared with the long bone length of normal embryos from the same matings, was reduced. Shortening of the upper beak was not seen in embryos less than nine days old.—J. C. Buxton.

Lamoreux, W. F. (1942). **Hereditary Chondrodystrophy in the Fowl.**—*J. Hered.* **33.** 275–283. **1473**

The precise genetic basis of chrondrodystrophy has hitherto been unexplained. L. found that in five generations of White Leghorns the character was inherited as an autosomal recessive (for which the genetic symbol *ch* is suggested) appearing in 22·5% of 1,713 classified offspring (*i.e.* embryos or chicks) of heterozygous parents ; there was no sex difference in incidence. —Alastair N. Worden.

Trasino, M. (1942). Ricerche sulle variazioni della temperatura corporea di animali fotosensibilizzati. **[Variations in Temperature of Photosensitized Animals].**—*Boll. Soc. ital. Biol. sper.* **17.** 333–334. **1474**

White pigs injected subcutaneously with 0·002 g. haematoporphyrin chloride and exposed to diffuse daylight or to sunshine sustained an average rise in body temperature of 0·6°C., whilst controls injected and kept in darkness showed a temperature rise of 0·3°C. [Only three animals were used in each group and one of the animals exposed to sunshine had an initial temperature of 38·3°C. compared with an average of 37·6°C. for all animals.]—J. E.

I. O'Reilly, J. N., & Gloyne, S. R. (1941). **Blast Injury of the Lungs.**—*Lancet.* **241.** 423–428. **1475**

II. Krohn, P. L., Whitteridge, D., & Zuckerman, S. (1942). **Physiological Effects of Blast.**—*Ibid.* **242.** 252–259. **1476**

III. Latner, A. L. (1942). **The Low-Pressure Phase of Blast.**—*Ibid.* **243.** 303–304. **1477**

I. An account is given of 17 cases (human) of blast injury to the lungs, ten severe and seven less severe. The main symptoms were severe shock, prostration and restlessness, respiratory difficulty, and pain in the chest. The principal physical signs were bulging of the chest wall, congestion and consolidation of the lungs. Pathologically there was gross effusion of blood

into the mediastinum due to rupture of capillaries; the histological findings of some cases are described. Five cases showed severe abdominal signs, great pain and tenderness and rigid abdominal walls; laparotomy in two cases showed nothing abnormal except a few small subserous haemorrhages, and operation is contra-indicated unless specific lesions are present. Restlessness was a constant symptom and bore a direct relation to the severity of the injury; P.M. examination suggested that this was due to an irritative lesion within the cranium. Diagnosis and treatment are also discussed.

II. Seventy-five rabbits, two monkeys, and two cats were used in extensive experiments on the physiological effects of blast; clinical observations were also made on goats, g. pigs, and mice. The size of the charge varied from 8–33 lb. polar ammon-gelignite and the distance of the animals from the charge was 6–14½ ft.

Experiments in which rabbits' trunks were protected while their heads were exposed to high blast pressures confirmed earlier observations [see *V. B.* **12.** 106.] that thoracic and abdominal lesions resulting from blast are due to the wave acting on the surface of the body and not to either the pressure or suction components of the wave acting through the nose and mouth. Animals exposed to explosions show an immediate fall in arterial blood-pressure which is related in extent and duration to the peak blast pressure experienced. The reasons for this fall are discussed. A marked and prolonged increase was observed in rabbits which survived exposure to blast. This appeared to be due to stimulation of deflation endings and increased sensitivity of stretch endings to expansion of the lung. When damage is severe enough to cause consolidation of whole lobes, respiration is very laboured because of changes in the elastic recoil of the lungs.

Animals exposed to high blast pressures are not concussed and electrocardiographic records show that there is no lack of co-ordination of the heart beat in blasted animals.

Possible ways in which blast may cause death are considered and certain clinical implications relating to diagnosis and treatment are discussed.

III. When mice were exposed to sudden low pressures of short duration, death occurred instantly or within a short period in approximately half the animals and injuries were produced similar to those produced by the high-pressure component [see II]. These results indicate that the low-pressure phase of blast may have a greater importance than that previously attributed to it. It is suggested that covering the chest with a tight bandage or jacket should help to prevent blast injury by checking overstretching of the lung substance. The apparatus used in these experiments is described and illustrated.—R. Allcroft.

NUTRITIONAL AND METABOLIC DISORDERS

Blumberg, H., & Grady, H. G. (1942). **Production of Cirrhosis of the Liver in Rats by Feeding Low Protein, High Fat Diets.**—*Arch. Path.* **34.** 1035–1041. **1478**

Albino rats, initially 125–200 g. in weight were provided with a basal diet of maize, 60, rolled oats, 15, meal scrap 14, skimmed milk powder 10, NaCl 1, cod liver oil 1·5, and some carrot once weekly. In addition, either wheat germ oil or maize oil was fed in sufficient quantities to increase the fat content of the diet to about 50% and to decrease the protein content to about 10%. Animals so fed for periods of 200–400 days developed liver lesions which culminated usually in diffuse nodular cirrhosis. The authors divide the pathogenesis of the lesions into three stages, *viz*, (1) a fatty stage appearing in animals autopsied after 50 days, (2) a stage of fatty change accompanied by proliferation of fibroblasts and monocytes, chiefly in the portal areas and perilobular tissue, and (3) a final stage in which the fibroblastic proliferation has disrupted the hepatic pattern and enclosed nodules of tissue in its meshes.—A. N. Worden.

Saxton, J. A., Jr., & Kimball, G. C. (1941). **Relation of Nephrosis and Other Diseases of Albino Rats to Age and to Modifications of Diet.**—*Arch. Path.* **32.** 951–965. **1479**

This paper deals with the disease encountered on P.M. examination of 216 rats which were used in an experiment designed to study the nutritional requirements of the latter half of the animal's life. Chronic pneumonia was the condition most frequently encountered, occurring in 81% of the animals which died naturally and in a percentage, increasing with age, of those which were killed during the course of the experiment; the pathological features of the disease appear to have corresponded with those described by other workers [see *V. B.* **7.** 583]. A renal lesion, designated "chronic nephrosis" was encountered in 44% of animals which died naturally. The third important disease was neoplasia; 48 of the 216 animals were found to have tumours (51 in all), which were classified as follows:– lymphoid tumours of the thoracic organs, 22; lymphoid tumours elsewhere, 10; myeloid leukaemia, 3; fibromas and fibrosarcomas, 11; epithelial tumours, 2.

It is considered that the three diseases occurred with sufficient frequency in ageing rats to exert an unfavourable influence on the average span of life. The incidence of chronic pneumonia and neoplasia appeared to be independent of dietary modifications, but chronic nephrosis was more prevalent in the high-protein than in the low-protein group, and in animals receiving their protein as casein than in those deriving most of their protein from liver.—A. N. Worden.

Dauber, D. V., & Katz, L. N. (1942). **Experimental Cholesterol Atheromatosis in an Omnivorous Animal, the Chick.**—*Arch. Path.* **34.** 937–950. **1480**

Deposits in the aorta were produced in the seven surviving members of a group of 12 cockerels which from ten days of age were fed for 15 weeks on a normal diet supplemented with 2·5 or 5% of cholesterol in cottonseed oil. The birds grew badly and were in a very poor condition compared with control chicks, which were free from atheromatous deposits. Some of the affected chicks had minor atheromatous changes in either the coronary or splenic arteries, and in those cases in which it was measured, the heart weight was slightly greater than that of control birds.

The arterial lesions produced are considered to be comparable with the earliest spontaneous atheromatosis which may develop with advanced age in the fowl.

—Alastair N. Worden.

Remington, R. E., Harris, P. L., & Smith, C. L. (1942). **Relationship between Vitamin A and Iodine Metabolism in the Rat.**—*J. Nutrit.* **24.** 597–606. **1481**

Weanling rats were maintained on a diet deficient in iodine and vitamin A until they were depleted of vitamin A as indicated by cessation of growth. Previous experiments had shown that a maximal degree of thyroid hyperplasia would be reached by this time on the diet used. Graded levels of vitamin A or carotene were now given to groups of these rats for six weeks. There was

no significant effect of this treatment on degree of enlargement or utilization of iodine by the thyroid.

A repetition of the experiment, with the difference that a sub-minimal dose of iodine was given, produced similar results. It is concluded that vitamin A plays no part in the aetiology of thyroid hyperplasia (simple goitre).

In a second series of experiments, rats on the doubly deficient diet were given various iodine and thyroid treatments. Administration of adequate doses of iodine prevented the development of thyroid hyperplasia but did not affect the vitamin A depletion time as indicated by the appearance of the first observable eye symptoms, or the survival time, as compared with untreated controls. Administration of thyroid, alone or with iodine, prevented the thyroid hyperplasia but considerably shortened the vitamin A depletion time and the survival time. Thyroidectomy considerably lengthened these times, this effect being prevented by administration of thyroid.

It is concluded that there is an increased use of vitamin A in thyroid hyperfunction and a decreased use in hypofunction, these changes running parallel with changes in general metabolism and not necessarily being specific.—D. G. Gilmour.

Leblond, C. P., & Chaulin-Servinière, J. (1942). Béribéri spontané du singe. [**Spontaneous Beriberi in the Monkey**].—*Ann. Inst. Pasteur.* **68.** 391–408. **1482**

Twenty cases are described of a disease of monkeys in which there were clinical symptoms of nephritis, heart failure, etc. P.M. examinations revealed some degeneration of peripheral nerves and hydropericarditis. The fact that these animals had received a diet which was deficient in vitamin B_1 in particular, indicated beriberi as the cause of the condition. Treatment with crystalline thiamine effected only a partial cure.
—J. C. Buxton.

Potter, R. L., Axelrod, A. E., & Elvehjem, C. A. (1942). **The Riboflavin Requirement of the Dog.**—*J. Nutrit.* **24.** 449–460. **1483**

The riboflavin requirement of the growing dog was found to lie between 60–100 μg. per kg. body weight daily, whether a high-carbohydrate or a high-fat basal diet was used. A daily supplement of 25 mg. of choline per kg. body weight was given in all cases. The symptoms and lesions which resulted in the riboflavin-deficient animals (*i.e.* fatty liver, dermatitis, muscular weakness of the hindquarters, tachycardia, conjunctivitis, and corneal vascularization and opacity) were similar to those which have previously been described [see also Street *et al.*—*V. B.* **12.** 301.]—A. N. W.

Edgington, B. H., Robison, W. L., Burroughs, W., & Bethke, R. M. (1942). **Tests with Nicotinic Acid for the Prevention of Infectious Swine Enteritis.**—*J. Amer. vet. med. Ass.* **101.** 103–108. **1484**

There was no difference in the response to infection with *Salmonella cholerae-suis* between young pigs on a nicotinic acid deficient diet and those receiving 100–300 mg. of nicotinic acid per day. Infection was set up either by feeding cultures of the organism or by exposure to infected animals. [The age of many of the experimental animals appears to have been well above that at which pigs in Great Britain are naturally susceptible to paratyphoid.]—Alastair N. Worden.

Richardson, L. R., Hogan, A. G., & Itschner, K. F. (1941). **Vitamin B_6, Pantothenic Acid, and Unsaturated Fatty Acids as They Affect Dermatitis in Rats.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 333. pp. 12. **1485**

The addition of both vitamin B_6 and pantothenic acid to a basal diet low in fat prevented and cured "rat dermatitis", but animals so fed ultimately failed to grow and died unless linoleic acid or methyl arachidonate was added to the ration. Omission of either vitamin B_6 or pantothenic acid from the diet always resulted in dermatitis, whether or not the fatty acid supplements were given.

The authors were unable to distinguish the skin lesions of vitamin B_6 from those of pantothenic acid deficiency [see also *V. B.* **10.** 956.]—A. N. Worden.

See also absts. **1557** (vitamin D), **1443** (worms and malnutrition)

PHYSIOLOGY AND ANATOMY

Negus, V. E. (1942). **The Mechanism of Swallowing.**—*Proc. R. Soc. Med.* **36.** 85–92. **1486**

The physiology of swallowing in man is described. A detailed review is given of the anatomy of the parts involved. The comparative features of carnivora, herbivora and lower forms of animal life are also discussed.—D. D. Ogilvie.

*Kvasnitskiĭ, A. V., & Bakeeva, E. N. (1940). [**Gastric Secretion and Digestion of Unweaned Pigs**].—*Trud. Inst. svinovod., Kiev.* **15.** 3–42. [Abst. from abst. in *Züchtungskunde.* **17.** 333]. **1487**

Piglets in their first few days of life were submitted to a gastric fistula operation under ether anaesthesia. The gastric secretion was found to contain pepsin and rennase from the first day, but HCl did not appear until 20–30 days of age. It did not increase progressively, and it became very scarce for a period before weaning. Milk clotted rapidly in the stomachs of newborn piglets. During the suckling period the stomach contents were acid, which is due more to the nature of the complex of the food and microbial flora than to the stomach secretion. Although pepsin is present early in life it is not utilized until HCl appears and does not come fully into operation until the last period of suckling (59 days).

In vitro tests demonstrated the rapid clotting effect of rennase and the breakdown of casein and protein by pepsin (from about the 45th day). Sow's and cow's milk and cereals are acted upon by the acid secretion of the stomach, leaving no free acid. This function is considered to be important for the development of the microflora and in relation to the genesis of digestive disorders.

Norris, J. L., Blanchard, J., & Povolny, C. (1942). **Regeneration of Rat Liver at Different Ages. Metabolism of Embryonic, Neonatal and Regenerating Rat Liver.**—*Arch. Path.* **34.** 208–217. **1488**

Regeneration after 65% hepatectomy in rats was found to vary, in rate and total amount, inversely with age, the hepatic cells of young animals having a greater regenerative capacity. Though the growth activity in the livers of young and old rats was comparable to that of neoplastic tissue, there was no increase in rate of anaerobic glycolysis over that of normal resting rat liver.

Embryonic and neonatal rat liver showed greater anaerobic glycolytic activity than adult liver, but this was found to be correlated with the amount of haemopoiesis in the organ and was probably unrelated to the growth and multiplication of hepatic cells, though this cannot be conclusively proved because of the difficulty of removing the haemopoietic cells.

It is concluded that the high rate of anaerobic glycolysis of neoplastic tissue is due, not to its greater proliferative activity, but to an inherent property characteristic of that tissue.—J. W. Whittick.

European children showed varying degrees of mottling of the teeth. Four cows reared on the farm showed mottled enamel and marked attrition of the teeth. Six male natives who had been working for some years in limestone quarries on the farm showed stiffness of the spine with complete rigidity in one case so that the native concerned could not stand upright.—E. M. R.

CLOUGH, G. W. (1942). **Theobromine Poisoning in the Dog.**—*Vet. J.* **98.** 196–197. **1507**

Several dogs died as a result of eating the same proprietary food which was found to contain theobromine. In one case two sheep dogs received two feeds each and died some hours later, following muscular exertion. The food contained a cacao by-product in which theobromine was present to the extent of 15 grains per lb. Three other dogs dropped dead, having received the same proprietary food containing 13 grains per lb. of theobromine. It is concluded that the deaths were due to the action of theobromine on the heart. —J. C. BUXTON.

*WILLEMS, A. E. R., & MATTHIJS, D. (1940). **[Pathogenic Action of Meal Mites (*Tyroglyphus farinae*) for Swine].**—*Vlaam. Diergeneesk. Tijdschr.* **9.** 177–181. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 316]. **1508**

Eight large and nine small pigs all sickened with diarrhoea and two sows among them showed paraplegia and perineal oedema. P.M. examination of two pigs revealed gastro-enteritis and kidney degeneration. The illnesses were ascribed to the ingestion of meal heavily infested with mites. Two g. pigs fed on it developed haemorrhagic enteritis and died in 18 and 94 days respectively.

It is suggested that the mites produce a toxin which is harmful to animals. The presence of the mites can easily be observed if infested meal is spread in a thin layer on white paper and covered by a glass plate. The mites move to the edges, leaving tracks.

KOMAROV, N. M. (1941). Vliyanie myshechnoĭ raboty na sostoyanie loshadeĭ pri toksicheskom oteke legkikh. Soobshchenie 2-e. **[Effect of Muscular Exertion on Pulmonary Oedema Caused by Diphosgene in Horses. II].**—*Veterinariya, Moscow.* No. 2. pp. 130–135. [French summary]. [Part I not available]. **1509**

Comparative studies were made on resting and working horses poisoned by diphosgene gas. Contrary to many other observers, K. found that horses, in which pulmonary oedema did not intervene, when put to work soon after being gassed were not more adversely affected than resting horses. Out of 63 horses which were put to work after poisoning, only two were unable to accomplish the task. [The exact amount of work done is not clear. The horses were given trotting and walking exercises with a load. One horse covered 1½–2 kilometres in 14 min. and another 16 km. in 4½ hours.] 10 min. after exposure to phosgene one of them was unable to work for longer than 14 min.; the animal subsequently developed pulmonary oedema and succumbed about 8½ hours later; the other horse was put to work three hours after exposure; a pulmonary murmur could be heard at that time. In spite of this it ceased work owing to advanced pulmonary oedema only after 4½ hours and after covering a distance of 16 km. In other horses no ill effects could be attributed to muscular work. After being worked, the horses showed no increase in temperature and no respiratory or cardiovascular disorders; on the contrary, horses subjected to muscular exertion showed a better pulse rate, no cyanosis and the development of the pulmonary oedema was less acute than in resting horses. Even when the first symptoms of pulmonary oedema supervened, moderate muscular work did not aggravate the general condition.

It was observed that horses in poorer condition were more resistant than well fed horses.—A. M.

See also abst. **1572** (war gases).

THERAPEUTICS AND DISINFECTION

I. MCDONALD, E. (1940). **Further Studies on the Bactericidal Agents Obtained from Soil Bacilli.**—*J. Franklin Inst.* **229.** 805–815. **1510**

II. WRIGHT, V. W. M. (1942). **Treatment of Infected Wounds by H-1, a New Germicidal Extract from Soil Bacilli Cultures.**—*Ibid.* **233.** 188–198. **1511**

III. WRIGHT, V. W. M. (1942). **Addenda to Treatment of Infected Wounds by H-1, A New Germicidal Extract from Soil Bacilli.**—*J. Franklin Inst. February, 1942.* pp. 12. **1512**

I. A description is given of the antibacterial substance isolated from soil bacilli by HOOGERHEIDE [see *V. B.* **12.** R2–R3]. It was found that the greyish, powdery, highly active substance was not a chemical entity and one active component was isolated from the crude material in crystalline form. The chemical and physical properties of the crystalline product are discussed. Unlike the crude material, the crystalline fraction was found to have only a slight inhibiting effect on the encapsulation of Friedländer's bacillus, but after removal of this fraction, the potency of the crude material was markedly increased. The crystalline product is highly bactericidal, but the minimum concentration for growth inhibition differs for different organisms. In general the crystalline fraction appeared less active than the crude material. Toxicity tests were carried out on mice, rats, g. pigs, and rabbits for the crude material and the crystalline product; the latter was less toxic to mice than the former and had not the strong haemolytic properties possessed by the crude product. Both products protected mice infected intraperitoneally with type I pneumococcus or *Bacillus anthracis* when mixed with the cultures immediately prior to injection, but when injected two hours after infection little protection was observed.

Application of the material to external lesions in 15 cases (human) indicated that the material was very useful and safe for treating superficial external infections.

II. The crystalline product described in I and designated H-1 has been found very effective in the treatment of lesions infected with Gram-positive organisms. A concentration of 0·0005 mg. per ml. of broth completely prevented growth of pneumococci and 0·0001 mg. per ml. broth inhibited growth of *Gaffkya tetragena*; encapsulation of Friedländer's bacillus was inhibited by 0·000005 mg. per ml. Toxicity experiments in mice and g. pigs showed that the substance was suitable for external use only and not for intravenous or intraperitoneal injection.

Clinical trials (human) have shown that the substance is quite harmless to the patient generally and to the tissues locally when used on external lesions.

H-1 was found to be especially valuable in treating osteomyelitis caused by staphylococcus when the infected area was adequately exposed surgically; one case of gas gangrene responded successfully to treatment with H-1 after failure to respond to sulphanilamide. It was also found to be of definite value in the control of infected diabetic and of ulcerating lesions of cancer.

IV. Observations were made on 12 mares for five months for external and vaginal manifestations of oestrus. Thirty-four of the 67 observed onsets of oestrus were accompanied by ovulation. Oestrus was observed in the summer and lasted in most cases regularly for 8–10 days. Of 53 oestral cycles which were accurately recorded, the average duration of the cycle in 77% of the cases was 21–22 days, in 23% the duration of the cycle was 28–29 days. It is pointed out that, owing to the great irregularities in the external manifestations of oestrus, it is not always possible to draw safe conclusions as to the onset of ovulation. A reliable sign, however, is the widening of the cervical canal. It can only be determined whether there is oestrus with ovulation when accurate external, vaginal, and internal observations have been made, together with microscopical investigations.—E. R. PARISER.

*GANS, O. (1939). Untersuchungen über den Zyklus der Stuten. V. Beitrag: Eierstöcke und Gebärmutter. [**The Sexual Cycle of Mares. V. Ovaries and Uterus**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **48.** 358]. **1500**

The following observations were made after rectal palpation of the uterus and ovaries of 11 mares between the beginning of August and the middle of October. Oestrus with ovulation occurred regularly during the three months, but oestrus without ovulation and ovulation without oestrus were also observed. The size of the ovary varied during the cycle from that of a pigeon's egg to that of a duck's egg and the follicles began to grow shortly before the middle of the interval, reaching their greatest size just before ovulation. It was observed that several follicles can mature at the same time in one ovary, but in 73% of the cases only one follicle ruptured; in the others two follicles ruptured at the same or different times. The size of the follicles varied between that of a hazel nut and that of a fist. Proliferation of the uterine mucosa developed parallel with the other oestrus symptoms. The interval in a 23-day cycle was 11 days, and more than half the follicles ruptured between the sixth and eighth days. —E. R. PARISER.

ASDELL, S. A., BOGART, R., & SPERLING, G. (1941). **The Influence of Age and Rate of Breeding upon the Ability of the Female Rat to Reproduce and Raise Young.**—*Mem. Cornell agric. Exp. Sta.* No. 238. pp. 26. **1501**

An extensive breeding experiment was carried out with four groups, each of 50 female rats, under similar conditions of management: group 1 was not allowed to mate until 270 days of age; group 2 was allowed to mate as soon after puberty as it wished; group 3 was mated at 100 days (normal age); group 4 also was mated at 100 days, but its young were removed at birth and the does allowed to remate immediately. In groups 1–3, remating was allowed after a normal 21-days' lactation. The main results were as follows:—in group 1, the interval between litters was increased, litter size was decreased, and the does were subject to dystocia and were bad mothers; group 2 was not so productive as groups 3 and 4; in group 4, litter size was consistently larger than in group 3, but the effective reproductive life of the does was less. In all groups, performance was better in the third and subsequent litters than in the first and second litters; in all cases, birth weight was inversely related to litter size, while weaning weight was directly related to birth weight; also, does which had a short interval between litters produced larger litters than did those with a longer interval; reproductive ability throughout life was indicated by initial performance.

A separate group of 50 virgin rats showed oestral irregularities, with earlier cessation of the cycle than was the case with groups 1 to 4. The discussion includes some reference to breeding studies with pigs. ——ALASTAIR N. WORDEN.

*ECKERSKORN, W. (1941). Zur Kenntnis der Totenstarre mit Untersuchungen über Eintritt und Verlauf der Totenstarre beim Pferd. [**Rigor Mortis and Its Occurrence in Horses**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 189]. **1502**

From examination of 60 slaughter horses, W. concludes that rigor mortis invariably occurs in healthy carcasses and that the cause is partly intrinsic and partly extrinsic.

*HERRATH, E. (1941). Beobachtungen an den Milzlymphknoten zweier Pferde. Zugleich ein Beitrag zur Frage des Vorkommens und der Bedeutung von Lymphgefässen in der Milz. [**Observations on Splenic Lymph Nodes of Two Horses; Occurrence of Lymph Vessels in Spleen**].—*Z. mikr.-anat. Forsch.* **49.** 299–316. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 1]. **1503**

The splenic lymph nodes had a mottled appearance, macroscopically. This was due to the presence in them of cavernous spaces containing clumps of erythrocytes and flocculi of lymph. The significance of this arrangement is discussed.—M. LANDAU.

*LANGER, P. (1941). Die Altersveränderungen der Milz beim Pferde mit besonderer Berücksichtigung der Gitterfasern. [**Age Changes of Horse's Spleen, with Special Reference to Lattice Fibres**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 171]. **1504**

The spleen of foals is softer than of full grown horses. Up to two years of age all splenic tissues grow and from one year haemosiderin is present. Elastic tissue begins to decrease at about the fourth year and muscular tissue increases up to the second year, thereafter remaining constant. Connective tissue decreases in relation to muscle and elastic fibres as the second year is passed.

The lattice fibre network is complete at two years of age and remains unchanged later. It is richly distributed in the pulp and around the blood vessels, including T-shaped fibres in the Malphigian bodies and ring fibres around the vessels.

*LAMS, H. (1941). [**The Olfactory Mucosa is Bare Brain Tissue**].—*Vlaam. Diergeneesk. Tijdschr.* **10.** 37–49. [Translation of abst. in *Wien. tierärztl. Mschr.* **29.** 329]. **1505**

Blood vessels can often be determined in the olfactory neuro-epithelium of mammals. The cells of the deeper layer are neuroglia cells. The olfactory neuro-epithelium is not really a covering epithelium and is therefore vascularized like the brain; moreover the secretion resembles cerebrospinal fluid. The olfactory mucosa is the only nervous tissue of the body to have direct contact with the outer world.

See also absts. **1425** (sex hormones), **1570** (anatomy of the dog), **1571** (embryology).

POISONS AND POISONING

OCKERSE, T. (1941). **Endemic Fluorosis in the Pretoria District.**—*S. Afr. med. J.* **15.** 261–266. **1506**

In Pretoria district the fluorine contents of the bore-hole water in different areas varies from 1·43–13·9 parts per million. On one farm where the fluorine content of the water was 11·78 p.p.m., both native and

European children showed varying degrees of mottling of the teeth. Four cows reared on the farm showed mottled enamel and marked attrition of the teeth. Six male natives who had been working for some years in limestome quarries on the farm showed stiffness of the spine with complete rigidity in one case so that the native concerned could not stand upright.—E. M. R.

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Several dogs died as a result of eating the same proprietary food which was found to contain theobromine. In one case two sheep dogs received two feeds each and died some hours later, following muscular exertion. The food contained a cacao by-product in which theobromine was present to the extent of 15 grains per lb. Three other dogs dropped dead, having received the same proprietary food containing 13 grains per lb. of theobromine. It is concluded that the deaths were due to the action of theobromine on the heart. —J. C. BUXTON.

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III. The cases treated by H-I in II are described in more detail in this report.—R. ALLCROFT.

WAKSMAN, S. A., HORNING, E. S., & SPENCER, E. L. (1942). **The Production of Two Antibacterial Substances, Fumigacin and Clavacin.**—*Science.* **96.** 202–203. **1513**

A preliminary report is given of the antibacterial substances isolated from two species of *Aspergillus*. The first, fumigacin, was isolated from the culture medium of *A. fumigatus* and is active against Gram-positive bacteria but has only limited activity against Gram-negative organisms such as salmonella and the colon-aerogenes groups [see also OXFORD & RAISTRICK—*V. B.* **12.** 355]. The second substance, clavacin, was obtained from *A. clavatus* and is particularly active against Gram-negative bacteria, the colon-aerogenes group being nearly as sensitive as staphylococci and spore-forming bacteria. Clavacin is highly bactericidal, thus differing from most other antibacterial substances which are usually only bacteriostatic; cultures, 6–18 hours old, of various Gram-negative and Gram-positive bacteria were killed within 2–6 hours by dilutions of 1 : 50,000–1 : 500,000 of crude clavacin. The substance recently isolated by WIESNER [*V. B.* **12.** 510.] from *A. clavatus* appears to be similar to clavacin.—R. A.

NETER, E. (1942). **The Effects of Anti-Microbial Substances of Biological Origin upon Bacterial Toxins.**—*Science.* **96.** 209–210. **1514**

The results are given of the effects of tyrothricin, actinomycin A, pyocyanase and dimethyl-benzylammonium chloride (zephiran) on tetanus toxin and diphtheria toxin. The toxin was diluted either in buffer solution (pH 7·2) or in infusion broth and then mixed with appropriate amounts of the respective antibacterial substances. The mixtures were injected subcutaneously into the leg of white mice either immediately or after incubation at 37°C. for various periods of time. The few experiments with diphtheria toxin were carried out in g. pigs. Pyocyanase and zephiran definitely inhibited the toxic and lethal effects of tetanus toxin. Tyrothricin had no immediate effect on the toxicity of tetanus toxin but it did inhibit the loss of toxicity of tetanus and diphtheria toxins which occurs after dilution with physiological saline or buffer solution and keeping at 37°C. or 4°C. for 24 hours or more. Actinomycin A had no effect on the toxicity of either toxin nor did it prevent the loss of toxicity after dilution.—R. ALLCROFT.

KIRBY, W. M. M., & RANTZ, L. A. (1943). **Quantitative Studies of Sulfonamide Resistance.**—*J. exp. Med.* **77.** 29–39. **1515**

A strain of *Bacterium coli* grown in a synthetic medium, to which was added sulphapyridine, sulphanilamide, sulphathiazole, or sulphadiazine, and subcultured every day, gradually developed resistance to all the drugs, irrespective of which was present in the medium. Maximal resistance, which was never complete, was reached on the 10th–12th day. The degree of resistance developed was correlated with the degree of bacteriostatic potency of each drug, and organisms resistant to a certain bacteriostatic concentration of one drug were equally resistant to similar concentrations of the other drugs. Also, organisms made markedly resistant to small amounts of the drugs were only slightly insensitive to higher concentrations.

Transfer of control organisms in varying concentrations of sulphanilamide showed that the degree of resistance developed varied with the concentration of the drug in the transfer medium. Further, the organism made maximally resistant to the lower concentration of a drug became more resistant when exposed to an environment containing a higher concentration of that drug.

It appears that the development of resistance represents an interaction between the organism and the one common structural unit of all the sulphonamides, *i.e.* the *p*-amino nucleus. The authors postulate that, despite reports to the contrary, all organisms susceptible to the bacteriostatic action of the sulphonamides are capable of becoming resistant to all of the sulphonamides.—E. J. M. HAYWARD.

BOROFF, D. A., COOPER, A., & BULLOWA, J. G. M. (1942). **Inhibition of Sulfapyridine in Human Serum, Exudates and Transudates.**—*J. Immunol.* **43.** 341–348. **1516**

Serum and pleural, ascitic, spinal, and pericardial fluids were found to have an *in vitro* inhibitory effect on the action of sulphapyridine, the test organism being a standardized strain of pneumococcus III which in inhibitor-free broth was killed by 1 mg.% of sulphapyridine in ten hours. This inhibitory action varied in different samples, being effective in drug concentrations of 1–15 mg.%. The size of the inoculum had little effect on the inhibitory action. Fluids allowed to stand for six months showed a decrease in inhibition which returned to the original value when the pH was adjusted to that of fresh fluids.—E. J. M. HAYWARD.

ZIPKIN, I., ANDERSON, A. K., & THORP, W. T. S. (1942). **A Study of the Administration of Sulfanilamide to the Normal Dairy Cow.**—*Amer. J. vet. Res.* **3.** 329–335. **1517**

Four cows were given sulphanilamide on two levels of dosage, 5 and 10 g. per 100 lb. body weight per day and the resultant concentration of free and conjugated (acetylated) sulphanilamide was estimated in the blood and milk. Whereas on the low level of dosage, 69% of total sulphanilamide in the milk was found to be acetylated, only 37% was present in the blood in this form. Thus although the blood of the cow contained 6·5 mg. total sulphanilamide per 100 ml. and the milk contained 12·7 mg. per 100 ml., only 31% of the latter larger concentration would be fully therapeutically active. On the higher level of dosage, the sulphanilamide was present in the blood almost entirely in the free form: 56% of the total sulphanilamide was conjugated in the milk.

The effect on the blood picture was also studied, the erythrocyte, and the leucocyte differential counts and haemoglobin content being investigated. The most marked change was on the high level of dosing, when a leucopoenia was produced representing a decrease in leucocytes of 60%. The leucocyte count rapidly returned to normal on cessation of dosage.

Milk production varied inversely with the excretion of sulphanilamide in the milk. The average decrease in weight consequent on dosage was 8·6%. One cow lost 160 lb. weight in 18 days.—D. L. ROBARTS.

STERNE, M. (1942). **The Treatment of Experimental Anthrax with Sulphapyridine (M & B 693).**—*S. Afr. med. J.* **16.** 121–124. **1518**

The experiments described were carried out on g. pigs infected with Pasteur's second vaccine. The dose given was 0·1 ml. of a stock suspension corresponding to about 50 guinea pig M.L.D. The sulphapyridine was given *per os*. It was found that the treatment protected 90% of g. pigs inoculated an hour previously. No immunity developed. When the drug was given 24 hours or later after the injection, no g. pigs were saved, although life could be prolonged. A considerable proportion could be saved when the drug was inoculated into the oedema which had developed after 24 hours. Myosalvarsan had no beneficial effect.

Sulphapyridine was less successful in rabbits and sheep inoculated with virulent anthrax. It is suggested that in man, sulphapyridine treatment *per os* may hold anthrax infection in check until immunity has developed.
—E. M. ROBINSON.

IVÁNOVICS, G. (1939). Ueber den Einfluss des p-Aminobenzolsulfamids und ähnlicher Verbindungen auf die Milzbrandinfektion. **[Influence of *p*-Aminobenzene Sulphonamide and Related Compounds on Anthrax Infection (of Mice)].**—*Z. ImmunForsch.* **96.** 252–254. **1519**

Mice were given 1–100 M.L.D. of *Bacillus anthracis*, and then treated with sulphanilamide or sulphapyridine subcutaneously or orally, with sulphaglycoside orally, or sulphapyridine plus a sub-effective dose of antiserum. The sulphapyridine given subcutaneously prolonged the life of mice given 1 M.L.D., while the other forms of treatment were without effect.—J. G. CARR.

SAVINO, E., & VILLAZON, N. M. (1942). Acción de la " sulfanilamida " y sus derivados en la peste experimental. **[Action of Sulphanilamide and its Derivatives in Experimental Plague].**—*Rev. Inst. Bact., B. Aires.* **11.** 70–76. **1520**

30% concentrations of sulphanilamide, sulphapyridine, and sulphathiazole, suspended in 20% gum arabic solution, were administered to g. pigs, and followed immediately by injections of a virulent culture of *Pasteurella pestis*. Sulphanilamide in a dose of 0·5–1·5 g. did not protect against even 1 M.L.D. of *Past. pestis*. Sulphathiazole and sulphapyridine protected in some cases against 10,000 M.L.D. In a few of these latter cases, a latent infection could be demonstrated by inoculating the affected viscera into healthy g. pigs. In others, latent infection could be demonstrated by simple seeding of the bone marrow on to agar.
—ISOBEL W. BURTON.

WISE, B. (1942). **In vitro Studies on Sulfonamide Action on Organisms of the Brucella Group and the Counteracting Effect of Para-Aminobenzoic Acid.**—*J. Pharmacol.* **76.** 156–160. **1521**

The bacteriostatic effects of sulphathiazole, sulphadiazine, and sulphaguanidine were compared on seven brucella strains: four of these were *Br. suis*, two *Br. abortus*, and one *Br. melitensis*. Sulphathiazole and sulphadiazine had a very similar effect, whereas the bacteriostatic effect of sulphaguanidine was more variable and less marked. Various concentrations of the drugs were tested. The inhibitory action of *p*-aminobenzoic acid on sulphathiazole was very marked.

Organisms grown in sulphathiazole broth and later subcultured into drug-free broth continued to show an inhibition of growth that could be counteracted by *p*-aminobenzoic acid.—D. L. ROBARTS.

I. WARREN, J., & SABIN, A. B. (1942). **Effect of Certain Antiprotozoal Drugs on Toxoplasma *In Vitro* and *In Vivo*.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 15–18.
II. SABIN, A. B., & WARREN, J. (1942). **Therapeutic Effectiveness of Certain Sulfonamides on Infection by an Intracellular Protozoon (Toxoplasma).**—*Ibid.* 19–23. **1522**

I. Various chemotherapeutic substances were tested against toxoplasms (a) by incubating *in vitro* heparinized peritoneal exudate from mice infected with the organism together with the drugs being studied, and then testing for survival of the toxoplasms by injecting the mixtures into mice, and (b) by administering the test substances to mice and rabbits infected with toxoplasms. The substances found active *in vitro*, with their concentrations and the times required for them to show their activity, were :– atebrin (1 : 50,000 for 3 hours), mapharsen (1 : 20,000 for 3–6 hours), trypaflavine, rivanol lactate, potassium antimony tartrate, optochin (1 : 10,000 for 3–6 hours), neosalvarsan (1 : 20,000 for 6–24 hours), and tryparsamide and quinine hydrochloride (1 : 10,000 for 6–24 hours). Stibosan (1 : 10,000), 4 : 4′-diamidino stilbene (1 : 10,000), sulphanilamide (1 : 4,000), sodium sulphathiazole (1 : 4,000), and sodium sulphapyridine (1 : 4,000) were without effect on the toxoplasm even after 24 hours. None of these substances, injected intravenously, intraperitoneally, or subcutaneously, had any effect *in vivo*.

II. Sulphathiazole and sulphapyridine, although without effect on toxoplasms *in vitro*, were found to have a completely inhibitory effect, and under certain conditions a curative action, on toxoplasma infection in mice when administered in the diet in a concentration of 1%. Sulphanilamide had almost no action. With the smaller inocula of toxoplasms (100 M.L.D. or less), sulphathiazole had a curative action if it was administered for at least 16 days, whereas with larger inocula the mice remained well as long as they were consuming the drug diet, but after the cessation of treatment they ultimately succumbed to the infection. Sulphathiazole in the diet was without effect on toxoplasms in rabbits, apparently because of the animals' irregular eating habits, but a good effect was obtained when large doses of the drug were administered parenterally at regular intervals day and night. Atebrin and quinine, although found to be active *in vitro* [see I.] were without effect when administered in the diet.—D. G. DAVEY.

FUNKE, A., BOVET, D., & MONTÉZIN, G. (1942). Propriétés trypanocides de quelques dérivés de l'éthylène diamine. **[Trypanocidal Properties of Derivatives of Ethylene Diamine].**—*Bull. Soc. Path. exot.* **35.** 210–211. **1523**

Some of the diamines derived from benzylamine were found to be actively trypanocidal for *T. brucei* in mice, administered either orally or parenterally.

The general formulae of the most active substances are given and discussed. It was also found that some naphthalene derivatives and citronellyl-amino-1 ethane, a non-aromatic diamine, had some trypanocidal action.
—U. F. RICHARDSON.

SWINYARD, E. A., HIRSCHFELDER, A. D., & WRIGHT, H. N. (1942). **The Therapeutic Effects of Repeated Subcurative Doses of Mapharsen on T. equiperdum Infections in the Rat.**—*J. Pharmacol.* **75.** 367–374. **1524**

This study was undertaken in view of the success reported recently in the treatment of syphilis with neoarsphenamine by the drip technique, and the lack of adequate information in regard to the therapeutic effects of repeated subcurative doses of organic arsenicals.

For the purposes of this study, the minimum curative dose [M.C.D.] was taken as the dosage of the sample of mapharsen employed which enabled 80% of the animals receiving it to survive infection. Untreated control rats were found to die 110 ± 20 hours after inoculation with the strain of *Trypanosoma equiperdum* used. Treatment was commenced 24 hours after inoculation with infected blood, the doses of the drug varying from 30–70% of the M.C.D., the number of injections varying from 2–20, and the interval between injections varying from 6–96 hours.

It is considered, as a result of these experiments, that doses in excess of 50% of the M.C.D. are uniformly curative at two or more doses, and at all time intervals even up to 96 hours.

With dosages of less than 50% of the M.C.D. the time factor plays an important role. With dosages of 40 and 30% M.C.D., the results obtained at the 6- and 12-hour time intervals are appreciably better than

at longer time intervals. The duration of the curative efficiency of a single injection of mapharsen in the rat does not greatly exceed 12 hours. For longer time intervals there is little difference between 24 and 72 hours, but an interval of 96 hours allows such a long time to elapse between the cessation of the curative effect and the next injection that the animals succumb to the infection. It is suggested that the time interval between injections should not exceed 12 hours, and that the dosage should be the maximum permitted by the incidence of clinical toxicity. The low curative value of dosages representing 30% M.C.D. indicates that the injection of doses which are too small, even though injected at frequent intervals, may fail to achieve the necessary minimal blood concentration, but yet be dangerous from the standpoint of the production of toxic manifestations.—U. F. RICHARDSON.

FRIEDHEIM, E. A. H. (1941). Contribution à la chimiothérapie par les arsénicaux organiques. L'azo-arséno-benzol dans le traitement de la syphilis et de la maladie du sommeil africaine. **[Contribution to the Chemotherapy of the Organic Arsenicals].**—*Schweiz. med. Wschr.* **71.** 1502–1504. [In French]. **1525**

The action of arsenobenzols is said to be limited by their inability to penetrate the haemato-ocular and haemato-cephalic barriers, but these barriers can be penetrated by organic anions. In synthesizing arseno-benzols with a strongly acid group, a condensation product of salvarsan with sulphonic acid was prepared which did not contain the unstable amino-methylene-sulphoxylate group of neosalvarsan, and remained stable at room temperature, even in solution, for at least six months. This substance, numbered 4197, is the sodium salt of the acid 4 : 4′-dihydroxy-arsenobenzol-3 : 3′-bis [(azo-2) naphthol-(1)-disulphonic acid-4, 8]. It appears in the aqueous humour half-an-hour after intravenous injection, and in the cerebrospinal fluid six hours later. Mice tolerate an intraperitoneal dose of 0·16–0·20 g. per kg. body weight whilst infections of *T. equiperdum* and *Spirochaeta recurrentis* in these animals are cured by an intraperitoneal dose of 0·008–0·012 g. per kg. Rabbits tolerate an intravenous dose of 0·125 g. per kg. body weight, whilst a dog of 25 kg. tolerated an intravenous dose of 2 g.

In 41 cases of human sleeping sickness given doses of 0·5 g. repeated 8–12 times at intervals of 2–5 days, the drug caused the disappearance of the trypanosomes after the first or second injection, and a lowering of the cell count of the cerebrospinal fluid. It also gave promising results in the treatment of syphilis.
—U. F. RICHARDSON.

*HÜLSMANN, H. (1940). Untersuchungen über die Verwendbarkeit des Präparates M.K.38 gegen die äusseren Symptome der Maul- und Klauenseuche. **[Value of "M.K. 38" against External Lesions of Foot and Mouth Disease].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 173]. **1526**

This remedy, containing phenol, caustic soda, and cod liver oil, is said to promote rapid scab formation on the affected teats of cows, thereby accelerating healing. It is unsuitable for use on the mouth or feet as it is too caustic to be licked off with impunity.

WELLS, R. W. (1942). **The Use of Power Sprayers in the Control of Cattle Grubs.**—*J. econ. Ent.* **35.** 112–113. **1527**

The use of a power sprayer for the control of warble flies dispenses with the tedious labour of scrubbing the animals' backs with brushes, and enables one operator to treat cattle more effectively and faster than six men by hand-scrubbing. The spray is applied vertically downwards on to the backs of the cattle at a pressure of 250 lb. To be effective, the nozzle is held about 15 in. from the back, and the stream adjusted to cover a diameter of approximately 2½ in. where it strikes the animal.

The composition of the spray recommended is derris powder (5% rotenone) 5 lb., wettable sulphur 10 lb., water 100 gal.—W. MOORE.

KNIPLING, E. F. (1942). **Acquired Resistance to Phenothiazine by Larvae of the Primary Screwworm.**—*J. econ. Ent.* **35.** 63–64. **1528**

Larvae of *Cochliomyia americana* repeatedly reared on media containing toxic concentrations of phenothiazine, developed a greater tolerance to the drug than was possessed by similar larvae reared on untreated media. The total number of survivors of the resistant strain was approximately 18 times that for the regular strain, when both were reared on a phenothiazine medium.—W. MOORE.

PARISH, H. E., & KNIPLING, E. F. (1942). **Field Studies of Certain Benzene Derivatives as Larvicides and Wound Protectors against the Screwworms.**—*J. econ. Ent.* **35.** 70–73. **1529**

A mixture of 95% diphenylamine and 5% calcium stearate was the most effective protectant found against reinfestation of wounds by *Cochliomyia americana.*
—W. MOORE.

TISDALE, W. H., & FLENNER, A. L. (1942). **Derivatives of Dithiocarbamic Acid as Pesticides.**—*Indust. Engng Chem., Industr. Edit.* **34.** 501–502. **1530**

Work on the derivatives of dithiocarbamic acid is reviewed. A marked degree of specificity is shown by members of this group of organic sulphur compounds on different pests. As is true with many sulphur compounds, the thiuram sulphides have shown a tendency to cause dermatitis in a low percentage of human beings. The alkyl derivatives are toxic to mites and highly toxic to the protozoan causing caecal coccidiosis of poultry.—W. MOORE.

SMITH, L. E. (1942). **Synthetic Organic Compounds as Potential Insecticides.**—*Indust. Engng Chem., Industr. Edit.* **34.** 499–501. **1531**

Of about 2,000 synthetic organic compounds tested by the U.S. Department of Agriculture since 1932, only 24 groups have been found to possess sufficient insecticidal value to warrant more extensive trial. A brief description of the insecticidal value of each of these groups is given.—W. MOORE.

KILGORE, L. B., FORD, J. H., & WOLFE, W. C. (1942). **Insecticidal Properties of 1,3-Indandiones. Effect of Acyl Groups.**—*Indust. Engng Chem., Industr. Edit.* **34.** 494–497. **1532**

The isomeric valeryl 1,3-indandiones exhibit powerful insecticidal action, approaching that of the pyrethrins. Their action, however, is not sufficiently rapid for use alone in fly sprays and their application appears to be as a substitute for the major portion of pyrethrum extractives. The laboratory preparation of these new compounds is described.—W. MOORE.

SMITH, C. M., & GOODHUE, L. D. (1942). **Particle Size in Relation to Insecticide Efficiency.**—*Indust. Engng Chem., Industr. Edit.* **34.** 490–493. **1533**

Finer subdivision of derris, pyrethrum, and phenothiazine, now available only in a comparatively coarse form, would undoubtedly improve their action. With oil sprays, the quantity of oil appears to be more important than the size of the droplets. [See also SEARLE—*V. B.* **12.** 556.]—W. MOORE.

WIGGLESWORTH, V. B. (1942). **Some Notes on the Integument of Insects in Relation to the Entry of Contact Insecticides.**—*Bull. ent. Res.* **33.** 205–218. **1534**

The rate of entry of pyrethrum mixtures through the insect cuticle is more rapid when the pyrethrum is dissolved in light mineral oil than in heavy oils. With vegetable oils, entry is very slow. The entry of all mixtures may be accelerated by the addition of oleic or other fatty acids.—W. MOORE.

FOGGIE, A. (1943). **On the Effect of Repeated Dosing of Sheep with Phenothiazine.**—*Vet. Rec.* **55.** 5–6. **1535**

F. treated two groups of sheep, heavily infested with *Ostertagia circumcincta* and *O. ostertagi*, and to some extent with *Haemonchus contortus*; one group contained 12 lambs and two hoggets, the other 14 lambs and two hoggets. The members of both groups were given 5 doses of 10 g. of phenothiazine at fortnightly intervals. One group received the fortnightly dose during a further five months. The first dose of phenothiazine produced a marked fall in the bulk egg count of all animals, and when the two groups were separated it had fallen from about 1,400 eggs per g. of faeces to less than 400. Thereafter, in spite of the repeated dosing of one group, no difference could be detected in either the body weights or the egg counts of the two groups. A residual, small worm burden remained in all the animals. F. suggests that phenothiazine "may assist the resistance mechanism of the host to bring the infestation rapidly down to the toleration level and may have little toxic effect on the worms directly". [If phenothiazine does actually stimulate the defensive mechanisms of the host, and no more, it is difficult to understand why these mechanisms are stimulated specifically, for example, why they are stimulated against *Ostertagia*, and not, or at least not much, against *Nematodirus* and *Strongyloides*.]—D. G. DAVEY.

STEWART, W. L., CROFTON, H. D., & FISHER, R. A. (1943). **Parasitic Gastritis in Sheep. Field Trials with Phenothiazine and Mineral Supplements [Including Statistical Analyses].**—*Vet. Rec.* **55.** 3–4. **1536**

Field trials were made on two farms with the object of investigating the cause of unthriftiness in lambs on pastures improved by top-dressing with basic slag, etc. In each trial the lambs were divided intogroups of 20 which received respectively phenothiazine (monthly doses of 15 g.), minerals (fortnightly doses of a solution containing salts of Co, Mn, Cu, Fe, and I), a combination of both treatments, and no treatment. At both farms all the treatments were successful as regards improvement in liveweight gain. At farm II the combined treatments were more successful than the single treatments, and it was found that phenothiazine, but not minerals, significantly reduced the worm-egg counts of faeces. It is concluded tentatively that mineral deficiency and parasitic infestation both depress liveweight gain in lambs on these "improved" pastures. —D. G. GILMOUR.

EDWARD, D. G. FF., LUSH, D., & BOURDILLON, R. B. (1943). **Studies on Air-Borne Virus Infections. II. The Killing of Virus Aerosols by Ultra-Violet Radiation.**—*J. Hyg., Camb.* **43.** 11–15. **1537**

When an aerosol of influenza virus was subjected to ultra-violet irradiation of wavelength 2537Å, 99% of the virus was killed after 6 seconds' exposure from a Hanovia lamp or a G.E.C. "sterilamp" at 2 cm. distance. In the case of vaccinia virus, the "sterilamp" killed over 99% at the same distance in 1 sec. and about 90% in 0·5 sec. Results with herpes virus indicated similar results but were not so satisfactory. —E. J. M. HAYWARD.

CHALLINOR, S. W. (1943). **Bacteriological Observations on the Air of Occupied Premises. I. Air Disinfection with Hypochlorites. A Simple Practical Method of Disinfecting the Air of Occupied Premises.** —*J. Hyg., Camb.* **43.** 16–54. **1538**

Investigation of the bacterial content of the air of an overcrowded room, by means of a "slit-sampler" showed that repeated spraying (at 20 or 30 minute intervals) with a solution containing 1% of sodium hypochlorite or 1·3% of water-sterilizing powder (bleaching powder) has a marked effect in reducing this content. Hypochlorite had the more reliable effect. This effect was not obtained by the spraying of water and is therefore not dependent on the mechanical removal of bacteria from the air. Relative humidity of the air was an important factor, the potency of the hypochlorite solution being reduced when the humidity was below a certain figure. Tobacco smoke also appeared to reduce the efficacy of the disinfectant.—E. J. M. H.

See also abst. **1573** (medicinal products).

HYGIENE AND PUBLIC HEALTH

THOMAS, S. B. (1941). **The Cellular Content of Milk. A Survey of the Literature. Parts I and II.**—*Dairy Indust.* **6.** 41–42 & 102–105. **1539**

THOMAS, S. B., & PROBERT, D. (1941). **The Cellular Content of Milk. Relation to Reduction of Resazurin and Methylene Blue. Part III. Correlation with Reduction of Resazurin and Methylene Blue. Part IV.** —*Ibid.* 269–270 & 295–296. **1540**

THOMAS, S. B., PROBERT, D., & MORGAN, K. (1941). **The Cellular Content of Milk. Experiments on Reducing Activity. Part V.**—*Ibid.* 323–324. **1541**

I & II. The first two parts of this exhaustive article on the cellular content of milk comprise a survey of the literature on the leucocyte counts of different types of milk. Among the records surveyed are those made on the leucocyte content of normal milk, of different portions of the milk during milking, of mastitis milk, of milk from udders infected with *Brucella abortus*, of colostrum and end of lactation milk, and of bulk herd milk, as well as the differential analysis of leucocytes in normal and abnormal milk, the influence of separation and clarification on the leucocyte content, the influence of pasteurization on leucocytes in milk, and the relation of the leucocyte content to the reduction of methylene blue and resazurin.

III. It was found that fresh normal milk had an average cell count of approximately 200,000. Of nearly 500 samples examined, 18% reduced resazurin to purple pink within one hour, whereas only 5% reduced methylene blue within 5½ hours. Of about 1,000 samples of "stored" bulk herd milk with an average cell count of 400,000, only 14% reduced resazurin and the figure for methylene blue remained at 5%. Milk from cases of subclinical mastitis had counts varying from 1–5 million. Over half of these reduced resazurin, but only 18% reduced methylene blue. Most of the samples of fresh milk from abnormal udders had high cell counts over 1 million and reduced resazurin to a vivid pink within one hour, and 66% also reduced methylene blue.

IV. The reducing activity of leucocytes in bulk milk kept for over 24 hours at atmospheric or refrigerator

temperatures was much less than of those in fresh milk examined within 2–4 hours of milking. Active reduction of resazurin by bulk herd milk over 18 hours old means that the cellular content is at least 1 million leucocytes per ml. About 8% of such milk reduces resazurin. With methylene blue the count is over 2 million before active reduction occurs. The type of udder cells present may have an influence on reduction of the dyes. Epithelial cells, such as are present in colostrum and end of lactation milk, are more active in this respect.

V. The removal of some of the cell content in normal milk, colostrum and end of lactation milk resulted in a proportionate loss of reducing activity. The addition of centrifuge deposits from end of lactation milk to normal milk increased its reducing activity. Fresh udder milk when kept for 24 hours at atmospheric or refrigerator temperatures showed a significant loss in reducing activity as compared to the same milk when examined an hour or two after milking.—D. L. HUGHES.

BEAHM, E. H. (1942). **A Bacteriological Study of the Streptococci Isolated from Raw Retail Milk.**—*Amer. J. Hyg.* **36.** 147–152. **1542**

Samples of raw milk were examined from 48 Omaha dairies and the streptococcal flora investigated. The milk from two of the dairies contained no streptococci, from 18 only non-haemolytic strains were isolated, and from seven only haemolytic strains. Thirty-eight haemolytic strains were investigated serologically and biochemically. Lederle's standard group A, group B, and group C sera were used as well as group D serum prepared by the author.

Twenty-four strains fell into group B, seven into group A, one into group C, and three into group D; three could not be grouped.

Biochemically those 24 strains which serologically fell into group B could be further divided into six types. The seven group A strains showed considerable biochemical variety. The one group C strain was biochemically the "human group C" strain. The three group D strains were not resistant to heating at 60°C. for 30 min.

Seventy-one cultures of non-haemolytic streptococci were isolated from 39 milk samples. Forty-five of these gave α haemolysis. On biochemical grounds, 39 strains investigated could be classified as *Str. salivarius*, *Str. bovis*, *Str. lactis* and *Str. faecalis*. No attempt was made to group any of the non-haemolytic strains serologically.—D. L. ROBARTS.

SUPPLEE, G. C., FLANIGAN, G. E., & JENSEN, O. G. (1941). **The Lethal Effectiveness of Ultra Violet Rays Applied to Milk.**—*J. Dairy Sci.* **24.** 1055–1070. **1543**

Using mercury arcs and other lamps with varying intensity emissions (of the comparative magnitude of 148, 87, 18, and 4 at a 12-inch distance and measured through quartz and a 2-inch aperture by a tantalum photoelectric cell), milk samples representative of the daily receipts from a country receiving plant, were subjected to ultra-violet radiation. The milk was passed in the form of a film over the quartz window, the thickness of the film and the speed of travel being controlled. From the experiments, which extended over a period of years, the authors conclude that the lethal effectiveness of ultra-violet energy applied to smooth flowing milk films is dependent upon the intensity and spectral characteristics of the radiation employed, and that a greater bactericidal effect was obtained by ultra-violet radiation applied to smooth-flowing milk films than was obtained from films flowing over a corrugated cooler surface. (This may be due to the fact that, in the latter case, there is an irregularity in the thickness of the film or because there is a reduction in the efficiency of the incident radiation, resulting from the energy impinging on the surface at angles substantially less than normal.) Short ultra-violet radiation, largely in the 2,200–2,300 Å region, gave erratic bactericidal results, and this lends support to the view that sublethal doses may stimulate bacteria. The authors conclude that percentage reduction in bacteria counts of raw mixed milk in excess of 90% and frequently up to 95–98% may be obtained with a high degree of regularity by applying ultra-violet radiation of appropriate intensity and spectral characteristics.—H. V. H.

PARRY, S. C. (1942). **A Water-Borne and Milk-Borne Outbreak of Paratyphoid B Infection in Worcestershire. Potential Dangers of Ram-Water Supplies.**—*Brit. med. J.* Dec. 5th. 661–664. **1544**

Brooks are frequently contaminated by sewage effluents. Hydraulic ram water consists of a mixture of water collected from a brook over a period and so is more likely to contain harmful organisms than water taken directly from a contaminated brook. Ram water supplies should, therefore, be considered as potentially dangerous for domestic purposes and especially so in connexion with food supplies.

A small paratyphoid B outbreak, involving 17 known cases, occurred as a result of infected ram water which was used on a farm with a milk bottling plant. One case in a small boy was due to drinking the infected ram water. A milker became infected either from contact with the boy, from infected water, or possibly by drinking raw milk, and the other 15 cases were associated in some way with the spread of infection from the ram water or from the infected milker who infected the milk, or by secondary infection from other cases.

The dairy, in addition to the milk from its own cows, received milk from six local producers and, although *Salmonella paratyphi* B organisms were absent in all milk samples examined from the six farms, infected water was used at the dairy for washing the milkers' hands and the udders of the cows prior to milking, to supply water to the cooler, and for washing out the cowshed and presumably the bottles.—H. E. B.

HENNING, M. W. (1942). **The Antigenic Structure of the Bacteria Incriminated in Four Unrelated Outbreaks of Food Infection.**—*S. Afr. med. J.* **16.** 253–255. **1545**

A study was made of four species of *Salmonella* isolated from cases of food infection in the Transvaal. In the first outbreak the organism was found to be *S. braenderup* containing the antigenic components VI, VII, eh : en. In the second one the organism proved to contain the same antigenic components but there were minor biochemical differences. In the third outbreak the organism contained the antigenic components IX, gm and was therefore *S. enteritidis*. In the fourth the organism proved to be a IV variant of *S. typhimurium*. This organism is usually associated with infections of pigeons, but it has been found in calves, colts, and chickens.—E. M. ROBINSON.

SAVAGE, W. (1942). **Food Poisoning.**—*Brit. med. J.* Nov. 14th. 584–585 and Nov. 21st. 615–616. **1546**

Referring to the large number of types of known *Salmonella*, S. points out that, whilst some cause disease in man only, some in animals only, and some in both man and animals, it is the members of the last group which are responsible for food poisoning. A number of outbreaks of a mild type of food poisoning from milk have been due to *S. dublin* which is a bovine type and occurs mainly in calves. Most species of animals, including many birds, contract salmonella infections, but sheep are rarely affected. Duck eggs have been

concerned with outbreaks of the disease, and a proportion of the rats in abattoirs examined by the author, have been found to be harbouring the organisms.—H. V H.

•BASTING, M. (1941). Zur Frage der Zuverlässigkeit der Probeagglutination bei der bakteriologischen Fleischuntersuchung. [**Reliability of the Agglutination Test in Bacteriological Meat Inspection**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 192]. **1547**

One hundred bacterial strains, which had given negative reactions to the agglutination test for meat poisoning bacteria and had given doubtful results on primary culture, were examined. Seventy-nine strains showed themselves by fermentation tests to belong to what German workers speak of as "the intermediate group" [of salmonella organisms], 12 strains behaved less typically yet were finally recognized as intermediate in type, whilst the remaining nine strains were of distinct genera outside the scope of interest.

These results [presumably] were considered to confirm the reliability of the agglin. test.

LESLIE, P. H. (1942). **The Bacteriological Classification of the Principal Cultures used in Rat and Mouse Control in Great Britain.**—*J. Hyg., Camb.* **42.** 552–562. **1548**

At present, bacterial anti-rodent control in Great Britain is based on the use of strains of salmonella. An examination of the six main commercial preparations, known conveniently as "viruses", showed that all the strains were serologically identical with *S. enteritidis*, their antigenic structure being IX : g,o,m : —. Fermentation tests showed that the six "viruses" fell into two groups ; "Liverpool", "Danysz", "Ready Rat Relief", and "Ratin" belonged to the subgroup *S. danysz*, while the other two, "London" and "*Institut Pasteur*" were of the classic *S. enteritidis* type.

A lengthy review is given of the literature on the pathogenicity of these organisms for man and domestic animals, showing that human cases of gastro-enteritis have been caused by their use ; the danger to man is thought to arise, not so much from accidental ingestion of the raw virus material itself, as from the contamination of foodstuffs that may result in rapid multiplication of the organisms in a short time, as it seems that adults, at least, are not very susceptible to small doses of the organisms. It appears also that other animals, and especially poultry, may be infected at times.—E. C.

TECHNIQUE AND APPARATUS

SHWARTZMAN, G., & BIERMAN, W. (1942). **A Technique for the Even Distribution of Gases through Bacterial Cultures.**—*J. Lab. clin. Med.* **28.** 102–104. **1549**

For their studies on the effect of various concentrations of the sulphonamides at different temperatures (37·5°–41·5°C.) on the growth of *Streptococcus viridans* in 0·4% glucose infusion broth of pH 7·4, the authors devised a technique which ensured constant slow agitation of the culture medium during growth by bubbling through it a gas mixture (CO_2 10 pts, O_2 5 pts, and N 85 pts) favourable for growth, carefully controlled temperature (constant to within ± 0·05°C.) and aseptic removal of culture samples during cultivation. —R. O. MUIR.

LEWIS, J. H. (1941). **An Automatic Pipette and a New Inexpensive Pipetting Machine.**—*J. Lab. clin. Med.* **26.** 1668–1671. **1550**

The new feature of this automatic pipette is a small two-way valve interposed between the barrel of a 2 ml. Luer syringe and the trocar which is used as a pipette tip. The side arm of the valve is connected by rubber tubing to the reservoir of fluid to be pipetted. Upward movement of the plunger under the action of a recoil spring closes the valve leading to the trocar and opens the side valve, thus permitting automatic refilling from the reservoir. The action of the valves is reversed on the downward or emptying motion of the plunger which is made under manual compression against the force of the spring. Movement of the pipette between reservoir and test tube is thereby avoided and the operation time in complement-fixation tests is reduced to $\frac{1}{5}$th–$\frac{1}{10}$th of the time taken with the ordinary pipette. The volume of fluid delivered can be varied by adjustment of lock nuts on the screw which carries the plunger up and down. The price of the apparatus is considered to be reasonable enough to permit the use of separate pipettes for as many as five reagents in a single test. It is shown how mechanical emptying of the pipette can be achieved by connecting the plunger to a compressed-air windscreen-wiper motor. Necessary mobility of the pipette tip is then obtained by insertion of thick-walled, small-bore rubber tubing between valve and trocar. —W. R. MUIR.

BRETEY, J. (1942). Récolte directe sur lamelle, sans transfert, de la totalité d'un culot de centrifugation. [**Direct Collection, on a Spatula, of the Entire Deposit from a Centrifuge Tube**].—*Ann. Inst. Pasteur.* **68.** 426–428. **1551**

Two methods are discussed for the collection of the whole of the deposit resulting from centrifugation upon a small disc introduced into the tube and seated in the first instance on mercury and in the second upon melted gelatin in the bottom of the tube. Both methods are discussed in detail, and a special type of centrifuge tube with a false bottom for the easier removal of the disc and deposit is described.—J. C. BUXTON.

KLIMENTOVA, A., KRUK, R., & YARMOL'CHUK, G. 1942. Konservirovanie bakteriologicheskikh i biologicheskikh preparatov vysushivaniem pri vysokom vakuume. [**Preservation of Biological Products by Drying** *in vacuo*].—*Zh. Mikrobiol., Moscow.* No. 7. pp. 14–22. **1552**

This paper summarizes the observations made during a period of six years by different laboratories of the All-Union Institute for Experimental Medicine and describes comparative studies on dried biological products. Various liquid preparations preserved in incubators and refrigerators lost some of their properties after several months, but the same preparations dried *in vacuo*, with or without previous freezing, remained unaltered for six years.

In small laboratories the preservation by drying of sera and cultures can be effected by simple vacuum installations, the drying process being carried out without previous freezing. The drying of labile preparations such as viruses may be carried out in the Flosdorf apparatus using carbon dioxide for freezing ; the latter, in the authors' experience, can be replaced by a mixture of ice and salt.—A. MOLDAWSKY.

RALPH, P. H. (1942). **The Use of Darkfield Illumination for the Study of Stained Blood Films.**—*Stain Tech.* **17.** 7–10. **1553**

R. points out that the difficulties usually associated with the examination of stained blood smears under dark-ground illumination can be eliminated by the proper use of a modern dark-ground condenser. The principal advantages of dark-ground over light-ground

illumination for blood studies are that structures not seen in a light field become visible and resolvable, and that a much more detailed differentiation of cell types becomes possible because of greater size range and refractivity. Photographs by light-ground and dark-ground illumination of megakaryocytes and cells of g. pig bone marrow are included for comparison. It was found also that dark-ground illumination may be used for stained sections and *intra vitam* stained cells of all types. R. urges that, where colour is to be used as a criterion, reference should be made to an accepted colour standard in order to achieve uniformity.

—C. HORTON SMITH.

DAVIDSON, L. S. P. (1941). **Biopsy of the Sternal Bone Marrow as a Diagnostic Procedure.**—*Edinb. med. J.* **48.** 678–687. **1554**

The picture revealed on blood examination may be similar in conditions due to widely different aetiology, and often more definite information may be obtained by examination of the bone marrow. Diagnostic elements may be found in the bone marrow in cancer, Hodgkin's disease, multiple myelomatosis and the lipoidoses. A marked lymphocytosis occurs in whooping cough, infectious mononucleosis, and lymphatic leucaemia, but it is only in the last that the marrow shows lymphocytic anaemia.

Obtaining specimens of bone marrow by sternal puncture is simple and painless, and although small foci of very active marrow may remain in the sternal cavity and the picture not be representative of the marrow as a whole, yet in the majority of blood diseases diagnostic information may be obtained. Details are given for the collection of a bone marrow sample in human beings.

Considerable variation is recorded in normal differential counts, and only changes widely different from the normal should be considered significant.

The diagnosis is discussed of macrocytic hyperchromic anaemias, microcytic hypochromic anaemias, leucaemia, aplastic anaemia, thrombocytopenic purpura, and a granulocytosis.—U. F. RICHARDSON.

HO, E. A., CHU, H. J., & YUAN, I. C. (1940). **Ilium Puncture, a Simple Method for Obtaining Bone Marrow from Dog.**—*Chin. med. J.* **58.** 679–681. **1555**

The dog is restrained on its side. A gauge 17 needle, 2½ in. long, with a stylet to prevent obstruction of the lumen, is inserted at the longitudinal midline of the ilium about 1 cm. below the crest, at an angle of 50°–80°, the point of the needle being directed ventro-posteriorly. When it reaches the bone, it is gradually pushed in with a screwing movement. A sudden yield of resistance indicates that the spongy bone has been reached. The stylet is then removed, a syringe fixed on to the needle, and the marrow fluid gently aspirated.

The same technique has been successfully applied to cats and rabbits.—M. H. KYAW.

SALUSBURY, H. M. (1942). **The Ear-Marking of Sheep in Some Parts of North Wales.**—*Vet. Rec.* **54.** 369–370. **1556**

This is an interesting account of the method used by shepherds in North Wales of ear marking sheep for purposes of identification. Twenty-six distinct markings are illustrated and it can be readily seen that a combination of these markings in one or both ears will produce over a thousand different markings. The sheep are marked when they are lambs and healing takes place readily and leaves no puncturing. The marking is done either by a very sharp knife or ordinary sharpened sheep shears. This method of identification is used principally in mountain sheep because temporary marking with pitch or raddle tends to be lost if the sheep are out in the mountains for prolonged periods of time.—G. D. S.

KENNARD, D. C., & CHAMBERLIN, V. D. (1940). **A Comparison of S-4 Type Sun Lamps and Cod-Liver Oil as a Source of Vitamin D for Poultry.**—*Bi-m. Bull. Ohio agric. Exp. Sta.* **25.** [No. 207]. 157–165. **1557**

"S4-type" sun lamps were compared with cod liver oil (containing 85 A.O.A.C. units of vitamin D per g.) as a source of vitamin D for the growth of chickens, for egg-production in Leghorn and Rhode Island Red pullets and the hatchability of the fertilized eggs, and for the growth of young turkeys. The basal diets [the vitamin D contents of which do not appear to have been assayed] appeared to contain adequate quantities of vitamin A, and in all experiments the performance of the "sun-lamp" groups was equal to that of the "cod liver oil" groups.

The comparative costs of the two methods of supplementation are discussed, and a warning is given that adequate vitamin A must be provided when the sun-lamp is utilized as a source of vitamin D.

—A. N. WORDEN.

See also absts. **1330**, **1332** (mastitis), **1337** (tuberculin), **1360** (clostridium), **1411**, **1412** (influenza), **1442** (staining of tapeworms), **1446** (nematode collection).

MISCELLANEOUS

—. (1942). **Agricultural Research in Great Britain.** pp. 96. London: Agricultural Research Council. [8vo] [1s. 6d.] **1558**

This publication gives a comprehensive and up to date (as at August, 1942) review of all State-aided agricultural research in Great Britain. Its organization is described in the first 14 pages (section I), after which follows a summary of investigations in progress at research institutes and advisory centres (section II).

Research work is carried out at three types of institution, *viz*, at those under direct control of the Ministry of Agriculture, at those under direct control of the Agricultural Research Council, and at other places located mostly at universities where agricultural research is financed by the State. All of it is co-ordinated and financed in ways to avoid overlap and duplication of effort. Lists of the above types of institution are given and the role of the Agricultural Research Council in all this research is explained.

The places of the Imperial Agricultural Bureaux and the Agricultural Improvement Councils in research are made clear; the former are concerned in the dissemination of relatively highly technical information among research workers and the latter with getting new knowledge incorporated into farming practice.

In section II appear summaries of current research, in which veterinary work is described principally in sub-section H on animal diseases (pp. 64–75), but other work on animal health is reviewed in other sub-sections on animal nutrition and physiology (pp. 56–62), animal genetics (pp. 62–64), dairying pp. 75–80, and poultry husbandry (pp. 80–83).—J. E.

CAMERON, A. E. (1942). **The Veterinary Profession in Canada and Its Trends in War Time.**—*J. Amer. vet. med. Ass.* **101.** 395–397. **1559**

Disappointment was experienced by the Canadian veterinary profession when in 1940 the Royal Canadian Army Veterinary Corps was disbanded, when the Canadian Army was entirely mechanized. The corps never undertook officially any duties in connexion with the inspection of meat or other foods.

Factors tending to influence private veterinary practice are the growth of governmental control of diseases, such as TB. or brucellosis, carried out by salaried officials, and the agricultural extension service, which is largely free. Small animal practice is expected to decrease, but, in contrast, poultry practice may be increased to protect a valuable food supply.

There are approximately 1,100 graduate veterinarians in Canada, of whom about 400 are in the Dominion service. About 70 students graduate each year, but it is questionable whether the livestock industry has sufficient veterinarians to meet normal risks in an economical way. This is an urgent matter, for there has been a general increase in livestock. In 1941, milk production increased by 1,000 million pounds over that of 1940. The demand for wool has led to an increase in the number of sheep, and the poultry industry has expanded. C. concludes by saying that there must be constant vigilance and studied preparation against any possible introduction of foreign plagues under normal risks or due to deliberate sabotage as a war measure.
—H. V. Hughes.

Kelser, R. A. (1942). **The Veterinary Profession and Its Present Responsibilities.**—*J. Amer. vet. med. Ass.* **101.** 383–387. **1560**

The average *per capita* consumption of meat in the U.S.A. is approximately 145 lb. a year, of which 50% is ordinarily consumed as pork, 40% as beef, 5½% as veal, and 4½% as lamb. The livestock and dairy industries are extensive but not inexhaustible, the herds, flocks, and droves of food-producing animals must be kept in good health by the veterinary profession if the country is to feed its people and its army and also to supply large quantities of foodstuffs to its allies. K. mentions some of the important tasks carried out by the civilian veterinarian, such as immunizing pigs against swine fever and swine erysipelas, vaccinating cattle against anthrax and blackleg, eradicating TB., and controlling sheep scab, pneumonia and parasitic diseases in sheep, apart from the general work on farm animals done by the veterinary practitioner. In the Army Veterinary Corps it has been found necessary to increase the numbers of officers and men for food inspection, but not for the care of animals of the army.—H. V. H.

Seeley, S. F. (1942). **The Procurement and Assignment Service for Physicians, Dentists and Veterinarians.**—*J. Amer. vet. med. Ass.* **101.** 388–394. **1561**

The assignment service in the U.S.A. deals with the allocation of persons to war work, according to the legislation in force. An account is given of the procedure being adopted by the service in order to utilize to the best advantage every member of the veterinary profession. Following the receipt of over 12,500 replies (out of 13,000 sent out) to the questionnaire addressed to the veterinarians in the country, the War Man-Power Commission has made an accurate and complete survey on the roster system of the whole profession. Whilst it is recognized that there is a national shortage of veterinary surgeons, S. states that if the services of all physically fit, professionally qualified veterinarians under 45 are required in the military services, it is there that they must serve. When a veterinarian enters the services the Selective Service Board is asked to reserve him for his civil work until such time as a vacancy occurs which will permit him to serve in his professional capacity in a war service. The aim is to ensure that veterinary surgeons of military age are employed where they can be of the greatest use; as long as their civil work is filling an essential need they should not be called up.—H. V. Hughes.

*Pepik, P., Peterson, H., & Peebsen, E. (1940). Märkmeid NSVL veterinaarala korraldusest. **[Experiences of the Veterinary Organization of the Soviet Union]**.—*Eesti loomaarstl. Ring.* No. 7. [Abst. from abst. in *Skand. VetTidskr.* **32.** 220–223]. **1562**

The Soviet Union Veterinary Directorate under the Peoples' Commissar for Agriculture controls the veterinary organization in each Soviet Republic at the headquarters of which is a Republic Veterinary Office. The Republic may be divided into provinces with a veterinary officer in the Provincial Agricultural Department, but in any case is divided into counties each of which has an Agricultural Institute, and has a veterinarian on the staff. The counties are subdivided into veterinary districts each with district veterinary inspectors; the latter are rarely lay inspectors; finally, within the district are so called "veterinary stations" staffed by laymen, the counterpart of the veterinary sanitary inspector. Thus in the Leningrad province there are 69 county veterinarians, 58 district veterinarians each with a clinic, and 58 veterinary stations.

The county veterinary inspector controls the abattoirs in his area and the preparation of animal by-products. Railway transport of animals is supervised by the veterinary transport department attached to Soviet Head Office and carried out by veterinary inspectors allocated to different railway stations [a service analogous to the inspection at British ports].

Under the control of each Republic veterinary office are the veterinary departments of the towns and cities which, like the county areas, are subdivided into veterinary districts, the services in which include a district clinic.

The primary aim of the service is disease prevention. To this end ample provision is made for research, laboratory services, and post-graduate courses. The clinical side is well catered for; X-ray and light therapy apparatus is available at county offices, and each clinic has a pharmacy under a qualified pharmacist and a diagnostic laboratory with a specially qualified veterinarian. The district veterinary inspectors have the assistance of the field sanitary lay staff; veterinary services are provided free of charge. Refresher courses of three months duration for the veterinary staff are compulsory at least once in five years.

Meat inspection is an important function of the service. The central meat control establishments are supervised equally by a veterinary surgeon and a specialist with technical knowledge of meat preservation and handling. These in turn control a large number of veterinary and other specialists who supervise all the work of the *ante-* and *post-mortem* examinations of animals, preparation of meat by-products, refrigeration, and distribution. As a storage pool behind this organization, a Republic maintains many large animal refrigeration stations. The department of Meat and Milk Hygiene of the Soviet Union Head Office controls the service.

Veterinary biological products are prepared at institutes linked to the laboratories referred to above. The Leningrad provincial laboratory has departments concerned with tuberculosis, brucellosis, swine fever, swine erysipelas, diseases of the new-born, and parasitology. Twenty-seven such centres prepare all biological preparations in the U.S.S.R. and work under the appropriate department at Head Office.

Alongside the general organizations stand certain special laboratories, as for instance the Ascoli, Dermatological and Parasitological Institutes which come under the general Soviet Union Veterinary Research Council, a section of the Academy of Agriculture.—G. B. Brook.

REPORTS

I. AUSTRALIA. (1939). **The Institute of Inspectors of Stock of New South Wales Year Book 1939.** pp. 83. Sydney. [8vo]. **1563**

II. AUSTRALIA. (1940). **The Institute of Inspectors of Stock of New South Wales Year Book 1940.** pp. 80. Sydney. [8vo]. **1564**

I. O'NEILL reports an outbreak of BLACKLEG in a flock of 800 merino sheep. The sheep had been shorn and immediately afterwards had been dipped in a non-arsenical dip mixture. Twenty died within 48 hours. It was concluded that the sheep had received cuts during shearing, and that the infection had been washed from the soil and acquired from the dip. Other sheep dipped similarly, but after the dip had been cleaned out, were unaffected. In another outbreak 13% of merino ewes died a few days after lambing in a paddock which had some years previously been cultivated and which was subject to flooding from a creek which ran through it.

WALKER describes a number of outbreaks of disease in sheep which he associates with *Salmonella bovismorbificans* and *S. typhi-murium* var. *narrabri*. He considered hot climatic conditions and the ingestion of *Solanum esuriale* were both predisposing factors. He also describes two outbreaks of POISONING in large flocks of sheep, due to *Oxalis corniculata*. Dosing with lime water was thought to be beneficial in this instance.

GORDON discusses the control of the nematodes infesting sheep in Australia. Attention is drawn to the correlation of outbreaks of infestation with climatic and other factors.

II. JONES, commenting on diseases of poultry in the central west of New South Wales, speaks of SPIROCHAETOSIS, PULLORUM DISEASE and SINUSITIS as being most commonly encountered. Amongst deficiency diseases, he mentioned PEROSIS, and he stated that after dosing with a 5% solution of manganese sulphate, no more cases occurred.

GILL urges the dipping of sheep after shearing when the number of pupae of *Melophagus ovinus* is at its lowest, derris or other non-arsenical dips being used. A second dipping is advisable 20–22 days later, when older pupae not killed by the first dip will be destroyed.

Deaths from ANTHRAX increased during the summer of 1939–40, and EDGAR attributed this to the fact that the rainfall in the area was above the average, the soil being moist for months and many latent anthrax spores thus reaching the surface soil.

HINDMARSH gives details of research being carried out upon BRUCELLOSIS in pigs, ARTHRITIS in lambs, AVIAN ENCEPHALOMYELITIS and SWINE DYSENTERY.

—H. V. HUGHES.

I. PALESTINE. (1940). **Department of Health. Annual Report for the Year 1939.** pp. 115. Items of veterinary interest pp. 99–102. Jerusalem: Govt. Printing & Stat. Off. [fcp] [175 mils.] **1565**

II. PALESTINE. (1941). **Department of Health. Annual Report for the Year 1940.** pp. 14. Items of veterinary interest p. 14. Jerusalem: Govt. Printing & Stat. Off. [8vo] [50 mils.] **1566**

I. RABIES was observed in 145 animals, *viz*, 101 dogs, 9 cats, 16 jackals, 2 wolves, 11 equines and 5 ruminants, Jaffa being the place where most cases occurred. The public showed little interest in preventive vaccination; a pack of foxhounds used for hunting jackals was given a course of vaccination, consisting of three successive daily doses of 5% virus repeated every four months.

II. This abridged report only states that "canine prophylactic vaccine was provided on demand by the veterinary authorities".—J. E.

TRINIDAD & TOBAGO. (1942). **Health. Medical and Sanitary Report of the Director of Medical Services for the year 1940.** pp. 8. Items of veterinary interest p. 4. Trinidad & Tobago: Govt. Printer. [fcp] [8c.] **1567**

No case of RABIES was recorded in human beings or cattle. 857 bats (*Desmodus rufus*) were captured and 627 of these were examined for the presence of Negri bodies; four were positive.

See also abst. **1450** (cancer report).

BOOK REVIEWS

—. (1941). **Protozoa in Biological Research.** [Edited by CALKINS, G. N., & SUMMERS, F. M.] pp. xli+1148. 226 figs., 4 plates. New York: Columbia University Press; London: Humphrey Milford, Oxford University Press. [8vo] [66s. 6d.] **1568**

It is stated in the preface that this book has been compiled with the object of stimulating research on unicellular animals, and the 19 specialists who have contributed to it have handled their subjects in such a way that it can hardly fail to achieve its object. Whilst the book is in no sense a text-book, certain problems of the biology of the protozoa have been discussed in great detail, and the mass of references given make it easy to refer to the original articles when further information is required.

The first two chapters on general considerations and the physical properties of the protoplasm of protozoa, by CALKINS, BEAMS, & KING, are followed by one on cytoplasmic inclusions by MACLENNAN in which mitochondria, digestive, segregation, excretory and storage granules, and Golgi bodies are discussed.

Chapters IV and V, by TAYLOR and MAST respectively, deal with the fibrillar system in ciliates and motor response, whilst chapter VI by JAHN and chapter VII by WEATHERBY discuss the problems of the respiratory mechanism, and the function of the contractile vacuole.

Chapter VIII by KIDDER and chapter IX by HALL deal with protozoan cultures, the first with methods of sterilization and tests for sterility, and the second with food requirements and other factors influencing the growth of protozoa in pure cultures.

Chapters X–XV by RICHARDS, KOFOID, TURNER, WOODRUFF, SONNEBORN, and JENNINGS respectively are concerned with the growth of protozoa and the isolation of pedigree cultures, the life-cycle and the alternation of asexual and sexual reproduction, fertilization, endomixis, sexuality, and inheritance of characteristics, the last being particularly interesting in view of the information given on inherited acclimatization and resistance to drugs.

A short chapter by BECKER emphasizes that pathogenicity is a matter of degree, subject not only to the species but also to the strain of micro-organisms, the defence mechanism of the host, and other conditions affecting host resistance. A particularly lucid chapter on immunology, discussing the mechanism of immunity, and the detailed immunity responses in malaria, leishmaniasis, and trypanosomiasis is contributed by TALIAFERRO, whilst KIRBY contributes chapters on the relationship between certain protozoa and other animals, and on the parasites of protozoa. In the first of these a very detailed review is given of the opinions of various authorities as to the significance of the flagellates of the rumen.—U. F. RICHARDSON.

CULBERTSON, J. T. [Assistant Professor of Bacteriology,

College of Physicians and Surgeons, Columbia University]. (1941). **Immunity against Animal Parasites.** pp. viii+274. 3 figs. New York: Columbia University Press; London: Oxford University Press. [8vo] [23s. 6d.] **1569**

This book is divided into three sections. Part I consists of chapters on natural resistance, age resistance, acquired immunity, requisites for an immunity response, parasites which elicit immunity, and the mechanism and demonstration of immunity. Part II deals with immunity in specific infections, being divided into chapters on amoebiasis, leishmaniasis, trypanosomiasis, malarias, and other haemosporidial infections, coccidiosis, "trematodiasis", "cestodiasis", "nematodiasis", and the response to arthropods. Each infection is dealt with according to the characteristics displayed in regard to natural immunity, antibody production, the passive transference of immunity, the mechanism of acquired immunity, and the use of immune phenomena in prophylaxis and diagnosis.

Part III contains chapters on the classification of parasites based on their immunological characteristics and relationships, the diagnosis of parasitic infections by tests for antigen or antibody, and vaccination against parasites. Particular emphasis is laid on the possession of similar antigens by natural groups of parasites, and the possibility of obtaining positive results in skin or serological tests with extracts of other parasites of the same group. As far as is known, various stages in the life-cycle of a parasite species have the same antigenic constitution.

The wealth of references supplied will make this book particularly valuable to research workers and advanced students of the subject, but the author seems to have accepted too readily the conclusions reached by research workers, sometimes as the result of rather limited experiments which are still awaiting confirmation. Parasitic infections of man seem to be fully dealt with, but for those of animals the information is meagre and not always correct. The statement that "most species of animals do not recover from an initial untreated infection with pathogenic trypanosomes" cannot be accepted, and may not always be true even of the species of domestic animal most susceptible to the species of trypanosome concerned. Again we read that "No effective method of vaccination against Theileria has yet been devised", the methods of immunization practised on large scales against *T. parva* in South Africa and *T. mutans* in North Africa being completely ignored.—U. F. RICHARDSON.

BRADLEY, O. C. [M.D., D.Sc., F.R.C.V.S.]. (1943). **Topographical Anatomy of the Dog.** [Revised by GRAHAME, T. (T.D., F.R.C.V.S., Professor of Anatomy, Royal (Dick) Veterinary College, Edinburgh)]. pp. xii+316. 128 figs. London & Edinburgh: Oliver & Boyd. [4th Edit.] [8vo] [28s.] **1570**

In the revised edition of this book opportunity has been taken to introduce important new data, although the original text and nomenclature have been retained.

The introduction of X-ray photographs into anatomy books has at last fallen into its proper place along with macroscopic anatomy, and 13 well chosen plates are introduced. A small criticism of these is that as an X-ray view is usually opposite to the view as seen of the actual specimen it would have been helpful to the student if the plates indicated which limb, or side of the body, had been photographed.

The black and white diagrams showing muscle insertions on bones are most helpful and, if perhaps too detailed for ordinary student use, will serve as an excellent reference. The action of muscles is also introduced.

A separate section on the lymphatic system is given and nomenclature is in accordance with contemporary American literature, but much work is still needed in this direction.

The line diagrams on the distribution of the peritoneum are an interesting addition and should assist in the solution of this vexed problem.

It is to be regretted that a table of contents has not been introduced. The editor is, however, to be congratulated on the assembly of the new edition which should be of great value to undergraduate and graduate alike.—C. W. OTTAWAY.

HUETTNER, A. F. [Associate Professor of Biology, Queens College, Flushing, N.Y.]. (1941). **Fundamentals of Comparative Embryology of the Vertebrates.** pp. xiv+416. 168 figs. New York: Macmillan & Co. [8vo] [$4.50]. **1571**

Science must take notice of detailed investigations in their relation to specific problems. The accumulation of compact and isolated pieces of evidence is of little value unless applied to existing knowledge or in the pursuit of new. The process of building up biological knowledge is essentially a comparative one, but to treat existing knowledge in a just and comparative way demands in the writer a rare collection of qualities which include critical interpretation, wide knowledge, patience, and a sense of balance. The rarity of this combination of qualities is manifest when we have so often to deplore the paucity of such treatment in text-books of biology. On glancing over the table of contents of this book one is misled into imagining that here we have just another book of type-embryology of *Amphioxus*, the frog, chick, etc. The book will meet the needs of the veterinary student who is embarking on the study of embryology and of the more advanced worker who wishes to refresh his knowledge. A familiarity with embryological principles, for example, is essential to an intelligent approach to histological investigation, and there is little work on disease which does not call, at some time or another, for a study of tissues. The laudable inclusion of a chapter on human development brings the book into somewhat closer touch than many of its predecessors with embryology of the higher types, with which the veterinarian is chiefly concerned. The first four chapters deal very clearly with the materials from which embryos are formed: protoplasm, the cell, sex, the chromosomes, the gametes, fertilization. The 15 remaining chapters are pure embryology. The author avoids controversy, wisely in a book of this sort, and where doubt exists he describes what he himself has seen, thus discouraging the perpetuation of inaccuracies. For instance, in the frog he is not satisfied that the neurocoele is connected with the gastrocoele by a neurenteric canal. In the specimens he has examined he finds no connexion and neither does he find that the anterior fusion of the neural folds is delayed by a neuropore, and although he is alive to the possibility of variation amongst species, he describes the condition as he knows it. The book as it proceeds does not lose sight of the significance of the increasing complexity of its subject and, what is so important, it does not neglect the relation of the complex to the simple or the part the simple plays in the evolution of the complex. It is by the full application of these relations that the evolutionary lessons of zoology can best be learnt and by which the portals of more advanced study can be approached. On these considerations alone the book can be recommended. The high standard of American text-book figures is again achieved. The generous illustrations, beautifully executed, play an important part in elucidating a subject which is so largely a consideration of complicated and related detail.—C. HORTON SMITH.

JACOBS, M. B. [Ph.D., Formerly, Lt. U.S. Chemical Warfare Service Reserve]. (1942). **War Gases. Their Identification and Decontamination.** pp. xiii +180. 8 figs., 1 appendix. New York, N.Y. Interscience Publishers, Inc. [8vo] [$3.00]. **1572**

This book has been written primarily for gas identification officers, chemists, medical officers, and wardens but it contains much of interest to veterinarians, especially in Chapters III and VII which deal respectively with "The Effect of War Gases on Materials, Water, and Food; Sampling" and "Decontamination". Problems concerning the contamination of growing crops and livestock are also briefly mentioned in chapter III. The other chapters deal with I "Classification of the Chemical Agents", II "The Physical Characteristics and Physiological Response of the War Gases", IV "Scheme of Analysis", V "Detection and Determination of Arsenic", and VI "Confirmatory Tests".

In the appendix tabulated data are given on the physical constants of war gases, the order of their toxicity, and military symbols and names for war gases; conversion tables for gases and vapours are also given.

The subject matter has been taken from recent literature, and there are frequent citations from official publications of the Ministry of Home Security and references to other works with due acknowledgment. The book is not nearly as comprehensive as that of PRENTISS [*V. B.* **11.** 488.], but the subject is treated clearly and concisely, and contains much useful and practical, as well as theoretical, information. The advice and opinions are those of the author and not of any official department.—R. ALLCROFT.

JENKINS, G. L. [Ph.D., Dean and Professor of Pharmaceutical Chemistry, School of Pharmacy, Purdue University], & HARTUNG, W. H. [Professor of Pharmaceutical Chemistry, School of Pharmacy, the University of Maryland]. (1941). **The Chemistry of Organic Medicinal Products.** pp. xii+457. Missouri, St. Louis: John S. Swift Co. Inc. [8vo] [23s.] **1573**

This book, written primarily as a text-book for advanced students in pharmacy who have had the requisite training in chemistry, should also prove useful to the biochemist. Its value to workers in medical and veterinary fields would depend on the extent of their basic chemical knowledge but, assuming an adequate background, it ought to fulfil the authors' hope of stimulating a better appreciation of the application of chemistry to the development of medicinal products. As indicated in a brief introduction, the importance of medicinal chemistry today is shown by the fact that the old materia medica, consisting largely of drugs of variable composition derived from natural sources, are rapidly being replaced by the synthetic products of the modern laboratory. For example, vitamins such as thiamin, riboflavin and ascorbic acid can be obtained more abundantly, in greater purity, and more economically from synthetic than from natural sources; there are also many, now indispensable, drugs whose sole place of origin is the test-tube. Good examples of this latter class are chloroform, ether, local anaesthetics of the procaine type, hypnotics of the barbituric acid series, and the antibacterial derivatives of the sulphonamides.

Before proceeding to the subject-matter proper of the book as outlined in its 15 chapters, a bibliography of more than 120 standard reference works, likely to be useful to the reader, is given. In addition there are numerous references throughout the text to original papers, and special references to books and reviews at the end of each chapter.

The classification of the contents is strictly chemical, although not following entirely the customary division into the major groups of acyclic, isocyclic, and heterocyclic compounds. Acyclic and isocyclic compounds are discussed together in 12 chapters under headings determined by the particular functional groups present, *viz*, Hydrocarbons; Halogenated Hydrocarbons; Hydroxyl Derivatives of Hydrocarbons; Ethers and Peroxides; Carbonyl Group; Carboxyl Group; Natural Mixtures; Amines; Cyanides and Nitro Compounds; Sulphur Compounds; Phosphorus, Arsenic, and Antimony Compounds; and Metallic Derivatives of Organic Compounds. There follow two chapters on Heterocyclic Compounds, and a final chapter on Stereoisomerism.

The volume in reality constitutes a brief text-book of organic chemistry supplemented by sections on physiological activity and, where justified, on the apparent connexion between such activity and chemical structure. Short notes on the pharmacology and therapeutic uses of the more important compounds are given as well as their accepted trade names [American]. Many structural formulae, charts, and diagrams are given throughout the text, and there is an excellent index.

—J. LOCHIEL MCGIRR.

HARTWELL, J. L. [Research Fellow, National Cancer Institute, National Institute of Health, United States Public Health Service]. (1941). **Survey of Compounds which have been Tested for Carcinogenic Activity.** pp. 371. Bethesda, Md: United States Public Health Service. [4to]. **1574**

In this comprehensive work, data are collected in tabular form on 696 different chemical compounds which have been tested for carcinogenic properties on the higher animals. In general, only compounds on which observations have been made for at least one month after the first application have been included in this review, and the compounds considered are single chemical compounds. Such complex mixtures as the tars, irradiated sterols, articles of diet, and mixtures of two or more pure compounds given simultaneously are excluded, but crude grades of definite chemical individuals are generally included and also radioactive elements, as the possibility of chemical action in the case of the latter substances cannot be rejected. Of all the compounds considered, 169 are reported to be carcinogenic, apart from 23 which are said to cause only papillomas. These active compounds are found in a great variety of chemical classes widely differing in chemical structure and it is pointed out that in substances of the closest chemical similarity, one may be active and another completely inactive. This may make it appear that there is little significance in chemical structure and that a study of molecular architecture could not be expected to contribute much to an understanding of the causation of spontaneous cancer, but H. points out that more careful consideration indicates that this line of investigation cannot be abandoned even though at present only fragmentary correlations exist between molecular structure and carcinogenic activity. Further careful study by means of previously used compounds and compounds not yet tested may be expected to throw more light on the aetiology of different types of cancer and it is hoped that the tabulated data may suggest other lines of investigation and further research.

A good bibliography is given, together with indexes of the compound tested, the route and site of application, the vehicles used for application of the substances, the different animal species, and the site of tumour formation.—R. ALLCROFT.

3574—Wt.P12—Dd.187—750—6/43—H. R. G. Ltd.—G.13

Printed under the authority of His Majesty's Stationery Office by H. R. GRUBB, LTD., Croydon

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